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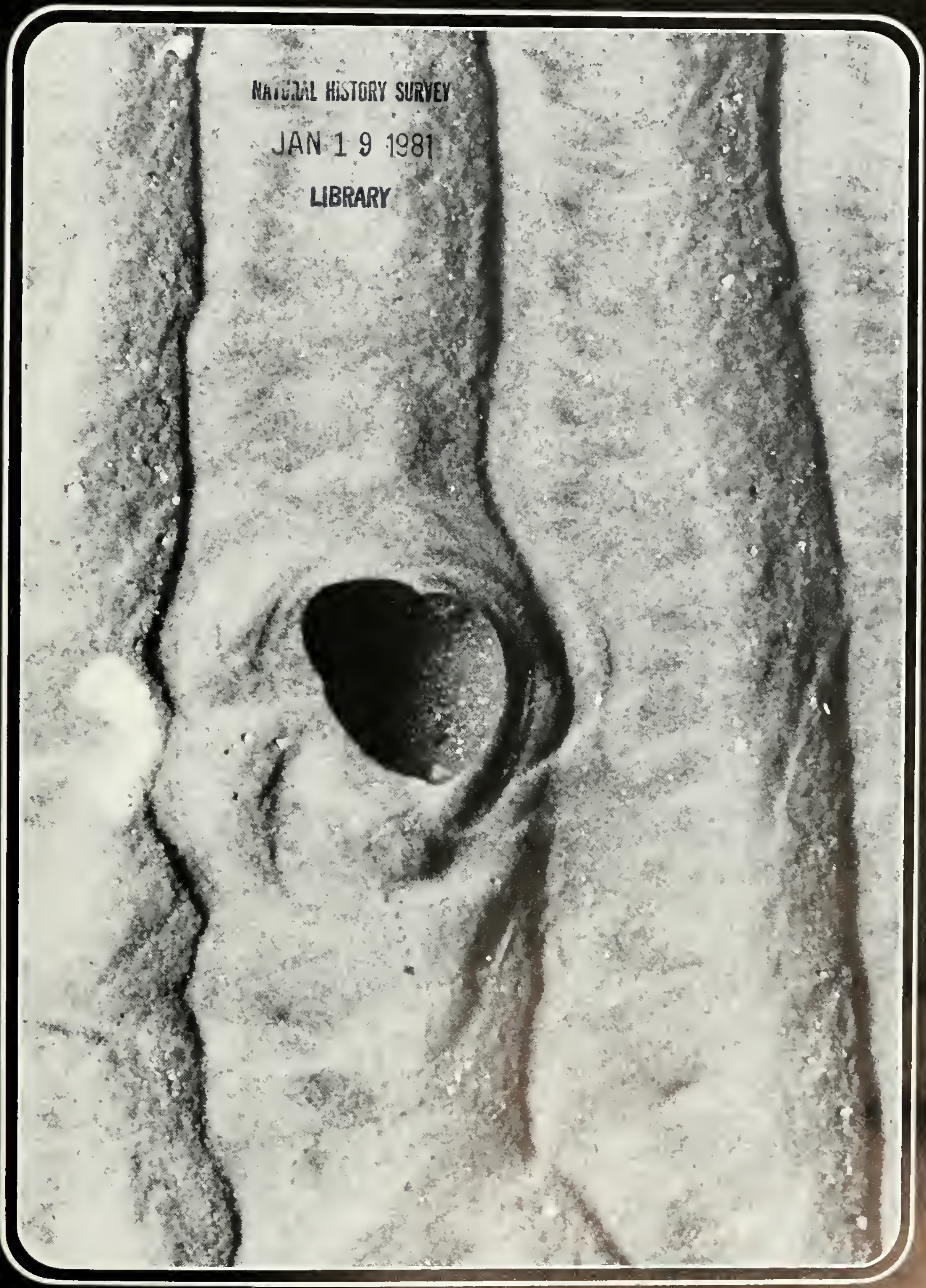
# IELD MUSEUM OF NATURAL HISTORY BULLETIN

January 1981



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**Field Museum of Natural History Bulletin**

January 1981
Vol. 52, No. 1

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## Field Museum of Natural History

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*An optical illusion by Mother Nature. Not a worm hole in some peculiar corrugation, nor an abandoned bird's nest in the clay, but a series of wave-formed ridges in the sand of a barrier beach, Stone Harbor, New Jersey, with an egg-shaped clay fragment in their midst. Similar clay balls have been reported on the coast of Delaware and on beaches in Scotland and Trinidad. This specimen was radiocarbon dated at 20,000–24,000 years old. Such clay balls on the Stone Harbor beach are probably fragments of a late Pleistocene silty clay layer which occurs widely over the continental shelf. They were eroded and redeposited on the beach under storm conditions. Photo by Michael Meza.*

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# FIELD BRIEFS

### Raup Named Dean of Science

David M. Raup, chairman of the Department of Geology since July, 1978, has been named dean of science, a newly created position. The new post includes responsibility for the four curatorial departments (anthropology, botany, geology, and zoology), the Library, Advanced Technology Laboratories, and the Center for Advanced Studies.

The post supersedes, in part, the position of assistant director, science and education, which additionally encompassed the departments of education and exhibition. Bertram G. Woodland, curator of petrology, has been named acting chairman of the Department of Geology.

### Robert K. Johnson Zoology Chairman

Robert K. Johnson, associate curator of fishes and head of the Division of Fishes, has been named chairman of the Department of Zoology, as of January 1, succeeding Melvin Traylor, curator of birds, who had held the chairmanship for two years. Traylor has retired and is now curator emeritus. (For more on Traylor's years at Field Museum see page 11.)

Johnson, who holds a doctorate from Scripps Institution of Oceanography, came to Field Museum in 1972 as assistant curator, was named associate curator in 1975 and head of the Division of Fishes in September, 1978. Assistant Curator Donald J. Stewart, who joined the Museum staff in 1979, succeeds Johnson as division head.

Dave Walsten

*Robert K. Johnson*

### China Bronzes Drew Record Crowds

The Great Bronze Age of China: An Exhibition from the People's Republic of China, on view at Field Museum August 20 through October 29 of last year, drew the largest number of viewers of any special exhibit since "Peru's Golden Treasures" was here in 1978.

According to Head Cashier David Sadowski, a total of 258,713 viewers were recorded during the exhibit's ten-week stay. In the closing week, attendance daily exceeded 5,000 and included from 70 to 80 percent of the total visitors to the Museum during that time.

In addition to the Museum staff, a volunteer force of 105 was enlisted to assist in providing admission tickets for the exhibit viewers and in other exhibit-related activities. A reception was held on November 5 to honor the China Bronze volunteers, who contributed, collectively, 4,000 hours.

After leaving Field Museum the China Bronze exhibit opened at the Kimbell Art Museum, Dallas/Fort Worth, on December 10 and will remain there until February 18. It will then travel to the Los Angeles County Museum of Art (April 1-June 10) and to the Museum of Fine Arts, Boston (July 22-September 30), before returning to China.

### Symposium Honors Henry S. Dybas

Tri-State University, Angola, IN, hosted a November 21 symposium in honor of Henry S. Dybas, curator emeritus of insects. Guest speakers at the symposium included entomologists from Indiana University, The University of Michigan, the University of Chicago, the University of North Carolina, and the University of Hawaii at Manoa.

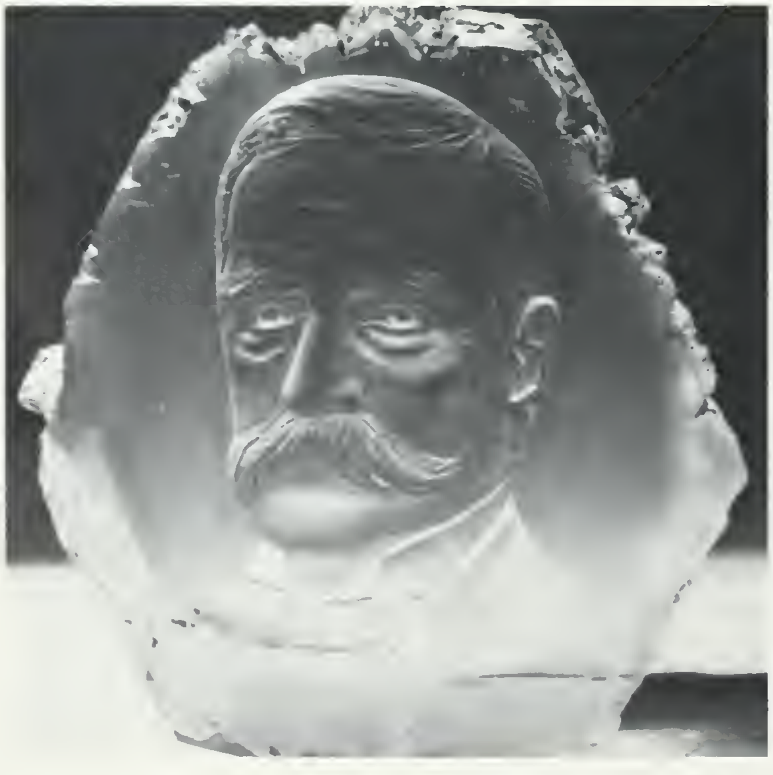
Dybas, who was also awarded an honorary D.Sc. at Tri-State's November commencement exercises, was cited for his outstanding contributions to entomology, notably in his studies of the periodical cicada ("17-year locust") and the Ptiliidae, or featherwing beetles, the smallest of the Coleoptera. Dybas joined the Field Museum staff in 1941 and retired August 1, 1980. (For more on Dybas's years at Field Museum see page 9.)

### NSF Grant to Division of Birds

The National Science Foundation (NSF) has awarded the Museum a grant of $54,756 in support of the project entitled "Support for the Systematic Collections in Ornithology," under the direction of John W. Fitzpatrick, associate curator of birds. The effective period of the grant is April 1, 1981 through September 30, 1982. This represents the first in a series of five annual awards. Each will be made contingent on the availability of funds and the progress of the project.

# FIELD BRIEFS

Ron Testa


Ron Testa

*A likeness of Field Museum founder Marshall Field I, carved in Russian beryl, a semiprecious gemstone, is presented to Field Museum by gem engraver Ute Bernhardt, center. Receiving the gift are Field Museum Director Lorin I. Nevling, Jr. (left) and David M. Raup, newly appointed dean of science. The gemstone, part of the Museum's permanent collection, was loaned to Bernhardt, of Oak Park, Illinois, for the carving of Field's image.*

*Helen Hayes, first lady of the American stage, is also in her own class as a faithful Field Museum visitor. Above, left, she poses with daughter Mary by the Museum's north portico, about 1939. Next, in 1969, with Hoshien Tchen, consultant, East Asian collection. Below, left, she views in 1979 the newly installed Japanese lacquerware exhibit, in Hall 32. With her are Mrs. G. Corson Ellis and Field Museum President E. Leland Webber. At lower right she is accompanied by Mr. John C. Murphy, of Chicago, in October, 1980, prior to viewing the Great Bronze Age of China exhibit.*

Dave Walsten

Dave Walsten

George D. Olson

# A Curatorial Legacy

## Six Zoologists Dedicate 226 Years' Service To the Field Museum of Natural History

BY ALAN SOLEM

*Curator of Invertebrates*

*Department of Zoology staff, 1972, including the six principals of this article: (front row) V. Reaves, R. Schoknecht, M. Prokop, H. Palmer, N. Whitt; (on chairs) P. Johnson, N. Kozlowski; (standing) Philip Hershkovitz, K. Liem, Loren P. Woods, Emmet R. Blake, Rupert L. Wenzel, Henry S. Dybas, L. de la Torre, Melvin A. Traylor; (on platform) B. Winter, B. Brown, D. Derda, V. Canty, M. Belka, C. Evers, R. Laubach, J. Kethley; (on ladder) H. Marx*

December 31, 1980, marks the end of an era for the Department of Zoology in Field Museum of Natural History. Melvin A. Traylor, chairman, and curator of birds, joins in retirement Emmet R. Blake, Philip Hershkovitz, Henry S. Dybas, and Rupert L. Wenzel. These five distinguished scientists, together with the late Loren P. Woods, former curator of fishes who died in May, 1979, collectively were associated with Field Museum of Natural History for 226 years prior to retirement. Although their terms were interrupted by military service during World War II or by occasional stints as visiting curators at other institutions, this is possibly an unparalleled record of participation.

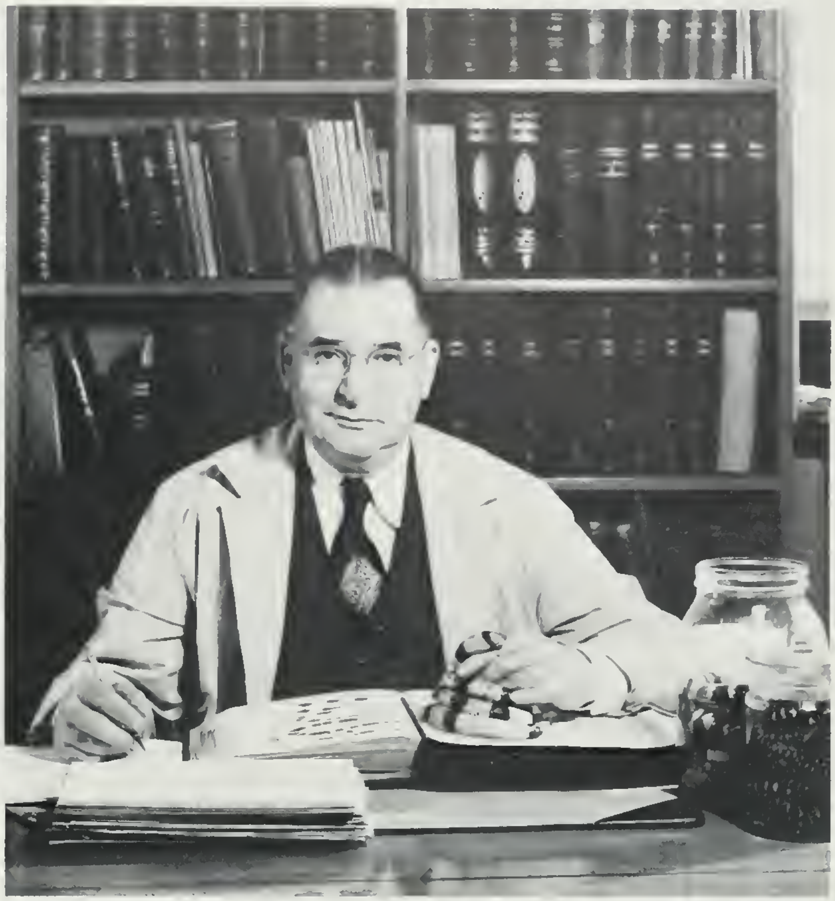
These six were in large part responsible for the expansion of our collections into world-class size, completing comprehensive library facilities, planning the building renovation of Zoology office and storage areas in the 1970's and living through the chaos of that period. Since they constituted half the curatorial staff in the Department of Zoology, their retirements over the last few years have brought in a new generation of curators, who inherit the tools needed to be productive and innovative in research—collections, library, equipment, space, and examples to follow.

All five retirees are now gleefully busy pushing major research projects to completion, happily ignoring meetings, paperwork, reports, and all the other aspects of daily work routine. Formal individual appreciations and reviews of their endeavors have been or will be published, but it seems appropriate to share with you the special features of this era and to emphasize the value of their collective contribution to Field Museum. First as a student volunteer in the mid-1940s, then as a colleague since 1956, I've been privileged to be part of this era and watch their accomplishments grow and change.

Today, new assistant curators in major museums are highly trained, publishing research scientists. The Ph.D. represents a "union card" needed before an application for employment will be considered. In the 1930s, a different tradition existed. A person with deep interest and enthusiasm, but lacking either an M.S. or a Ph.D., could join the staff of a major museum, *learn on* the job, and gradually develop into a world authority. Similarly, the goal of an eventual monumental publication requiring from one to three decades of concentrated effort was much more feasible. The concept of one person synthesizing a half century of work in a field of science was much more practical, since neither the scientific literature explosion of the 1950s through 1970s nor the increasing dependence of financing research on short-term grants from outside sources had yet occurred. The nature of zoological research in museums also has changed, from the comparatively simple quartet of mind, specimens, library, and habitat, to at least an octet of data from sophisticated instrumentation for study of ultrastructure, biochemistry, karyology (the study of cell nuclei), and computer analysis. While most museum research still is based on specimens and observations, the type and amount of data used in research has become much greater and more varied.

All six new staff members arrived with B.A. or B.S. degrees, but only Hershkovitz and Blake had an M.S. Rupert Wenzel completed work on his Ph.D. at the University of Chicago in 1962. Emmet Blake was awarded an honorary D.Sc. in 1966 from Presbyterian College of South Carolina, and Henry S. Dybas has just been awarded an honorary D.Sc. from Tri-State University, Angola, Indiana. Their work, rather than their degrees, stands as their current credentials.

A critical feature of Field Museum's Department of Zoology was the presence of an inspiring leader, the late Karl P. Schmidt (1890-1957), a distinguished herpetologist. He possessed the unique gift of being able to launch a career during a brief conversation, and literally several hundred biologists decided to earn Ph.D.'s because of his enthusiasm and influence. A major part of my own education as a biologist was obtained not in college or graduate school, but during "brown bag" summer noon hours. The Field Museum "lunch club" was presided over by K. P. Schmidt and populated by many of the scientific staff talking over cups of tea.


*Karl P. Schmidt, 1954*

A final ingredient was the view that the *world* was the proper focus of Field Museum. Instead of being tied to a single regional focus, the staff attempted to build collections and library facilities on a worldwide basis, recognizing that many types of comparative studies could be made only where worldwide resources were available. The fact that today all major collections in the Department of Zoology have a world focus results directly from this view by the staff and from strong continued support by the administration and the Board of Trustees.

Thus, the Department of Zoology provided an opportunity for personal development, an inspiring leader, and full administrative support for amassing library and collection resources. It was into this milieu that our six scientists entered and flourished, each in his different way. In looking at the history of a particular collection in a long established museum, often one can detect an alternation of generations between curators whose primary impact has been in building of collections and curators who primarily have made use of collections through research publications. An attempt to seek balance between these extremes during a career still is one of constant struggle. Participation in major exhibition work, educational activities, graduate student supervision, public relations, fund raising, national and international scientific societies, editing professional journals—all are activities in which curators are involved. (Space does not permit chronicling these aspects. Here I only review Department of Zoology activities.)

Although Rupert L. Wenzel was a volunteer in insects in 1934 and 1935, and a part-time book shop and cloakroom attendant in the late 1930s, his formal association with the Department of Zoology began on May 1, 1940, as assistant curator of insects. He completed 40½ years of service on October 31, 1980, having served as curator of insects, chairman of zoology from 1970 to 1977, and in a multiplicity of capacities on museum committees. Deeply involved in civic affairs in his community, always called on by organizations for help, author of numerous encyclopedia articles, and perpetually available for council and advice, Rupe Wenzel has been a mainstay of the Museum in many ways. Couple this with his building of the insect collection and library into premier status, and you have a remarkable career of service to Field Museum.

One of Wenzel's classic stories involves his predecessor as curator of insects in the late

*Rupert L. Wenzel (rt.) shows case of beetles to William J. Gerhard, then curator of insects, about 1950.*

*Rupert L. Wenzel (left) and Henry S. Dybas, about 1950*

*Rupert L. Wenzel with assistant, 1963*

1930s. When a visiting scientist asked where he could find the collection of exotic beetles, Curator William Gerhard replied, "In the same box they were in 20 years ago." Today, the exotic beetle collection occupies thousands of boxes.

The Division of Insects enjoys a worldwide reputation, expanded and renovated quarters, and one of the finest arthropod libraries in the world. These results of Wenzel's efforts stand as a permanent monument. Long ecognized as the world authority on bat flies as vell as histerid beetles, he has waiting before im collections that will provide data for many nonographs still to be produced in his retirenent years. These could, in time, crowd to a orner of a shelf his previous magnum opus, *ctoparasites of Panamá,* an 861-page tome oedited with V. J. Tipton and recognized as a nodel study of parasites and their hosts. In ecognition of this valuable work, President Robles of Panama awarded Wenzel the Order of Vasco Nuñez de Balboa, Grade of Caballero, in 1967. Perhaps the best Field Museum example of a builder of research facilities, Rupert L. Wenzel now becomes a user of these same facilities, freed from administration and other routine duties.

Henry S. Dybas began as a part-time assistant in the Division of Insects on March 1, 1941, retiring as curator of insects on August 1, 1980, after a career spanning 39½ years. An extremely widely read and thoughtful biologist, he has served as a sounding board and critic for people in many disciplines. Students and staff alike have benefited and continue to benefit from discussing new ideas with him and receiving an appropriate nudge toward a different approach. A major part of this interchange takes place during the "Dybas salon," an informal lunch in his office on most

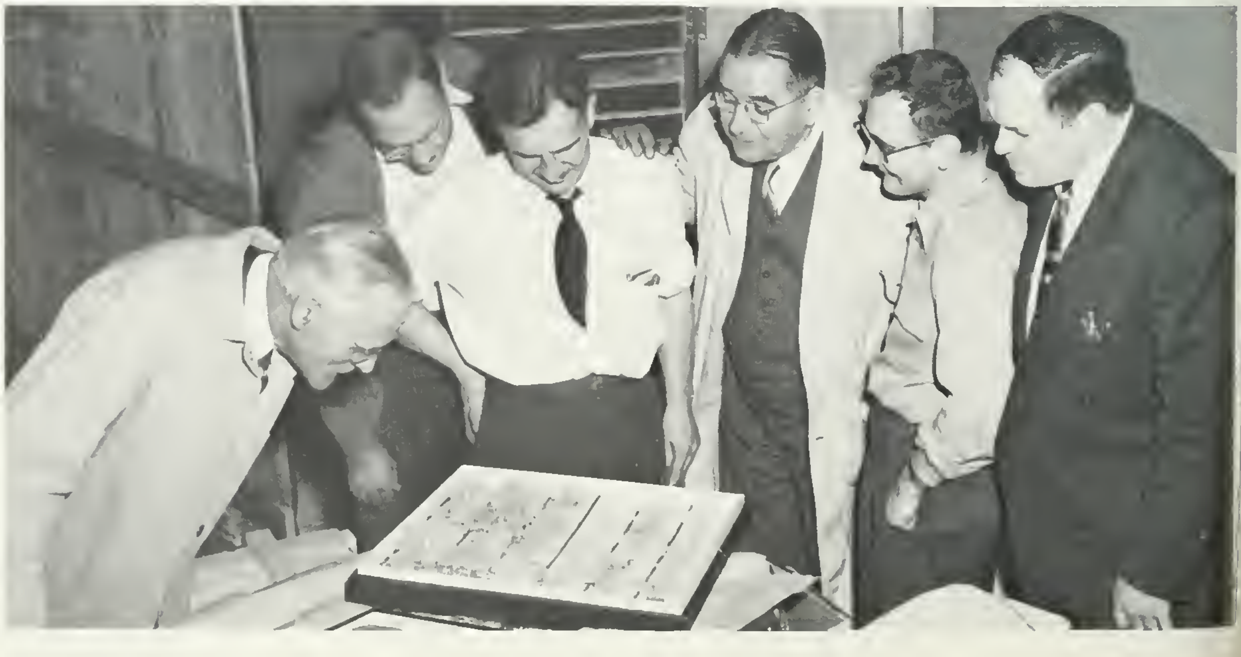
*Henry S. Dybas collecting featherwing beetles in Panama, 1959*

Saturdays, when anthropologists, paleontologists, zoologists, and botanists who have come in for a few hours of research effort without ringing telephones or staff interruptions assemble for sandwiches and talk. His comment to me after an early lecture I gave at Field Museum that "land snails don't seem to have any biology," reflecting the lack of ecological content in my presentation, is typical of these nudges. I remember it frequently as I grunt and sweat after snails in an Australian desert. Much of my own ecological emphasis came as a result of such discussions.

In keeping with his breadth of interests, publications on the phenomenon of parthenogenesis and on the evolution of small size in insects extend his systematic work on the featherwing, or ptiliid, beetles, the world's smallest beetles. But undoubtedly his greatest scientific fame, as coauthor of what probably is the most cited technical work by a zoology staff member of Field Museum, rests on cooperative work by Dybas, Monte Lloyd, and Dwight Davis (former curator of vertebrate anatomy), on the ecology and evolution of the periodical cicadas. Massive collections of soil litter arthropods resulted from his many field trips, and even more have come in from people whom he interested in undertaking such studies. Thus, a major legacy is the general collections Dybas accumulated in the course of his own research and of efforts by friends and students. His service as administrative head, Division of Insects, during the construction activities was a major contribution to Field Museum. The "Saturday salon" continues, as does work on featherwing beetles.

Emmet R. Blake formally became assistant, Division of Birds, on July 1, 1935,

*Early '50s scene of Museum staff as they view unpacking of insect collection. From left: William J. Gerhard, unidentified, Henry S. Dybas, Karl P. Schmidt, Hymen Marx, Robert E. Bruce.*



although between 1931 and 1934 he had participated in Field Museum expeditions to Venezuela and Guatemala sponsored by Leon Mandel. Such scientific endeavors occurred between periods as a professional boxer in a carnival and as an athletics instructor in summer camps. On retiring as curator of birds on November 30, 1973, Bob Blake left behind a reputation as one of the best field collectors in the history of Field Museum, fabled stories from a World War II period in the Army's Counter Intelligence Corps and a solid reputation as both a builder of collections and a productive scientist. Most of his effort over these 38½ years was focused on the faunas of Mexico and South America. His handbook, *Birds of Mexico,* first issued by the University of Chicago Press in 1953, entered its seventh printing in 1974. Leading ornithologists still consider it the standard reference on Mexican birds.

Now in quite active retirement, he has achieved the capstone of his career—his four-volume *Manual of Neotropical Birds.* Rave reviews accompanied the appearance of volume I, a massive 674-page tome issued by the University of Chicago Press in 1977. One-third of all known species of birds live in South and Central America—the region covered by the book. Attempting to synthesize the great body of information involved is a formidable task. In the words of one reviewer, "One cannot fail to be awed by the uncommon order of dedication and scholarship required to complete such an undertaking," while another called it the "most ambitious work on the avifauna of the neotropics ever attempted... an indispensable reference... marks the dawn of a new era of neotropical ornithology."

Notes on Blake's field trips indicate an incredible productivity and amount of hard work coupled with meticulous planning: a 35-day trip to Mt. Turumiquire, Venezuela, resulted in the collection and preservation of 803 birds, 96 reptiles, and 37 mammals; in 1955, a 14-week trip to Mexico covered 15,132 miles by truck—at a total cost of $793.21, including 1,065 gallons of gasoline—an incredible financial exploit at its time, much less believable when viewed today after a quarter century of inflation! Seemingly quiet and modest, Bob remains a superb raconteur, when he can be distracted from the *Manual of Neotropical Birds.*

As with Emmet Blake, it is difficult to say when Melvin A. Traylor actually joined Field Museum. In 1937, soon after graduation from Harvard, he did ornithological field work in Yucatan, studied this material at Field Museum, and then served consecutively as associate, Division of Birds, 1940-48, and research

*Emmet R. Blake during Peru expedition, 1958*

*Melvin A. Traylor, 1962*

associate, Division of Birds, 1948-55. Through these years, as an unpaid, but nearly full-time worker, he compiled an enviable record of useful publications on birds of the New World. Upon joining the paid staff as assistant curator in 1956, he switched his research emphasis to Old World birds to better complement the activities of Curator Blake. Resulting from this period of work were a classic 250-page checklist of Angola birds in 1963 and an important report on birds from Szechwan, China, in 1967.

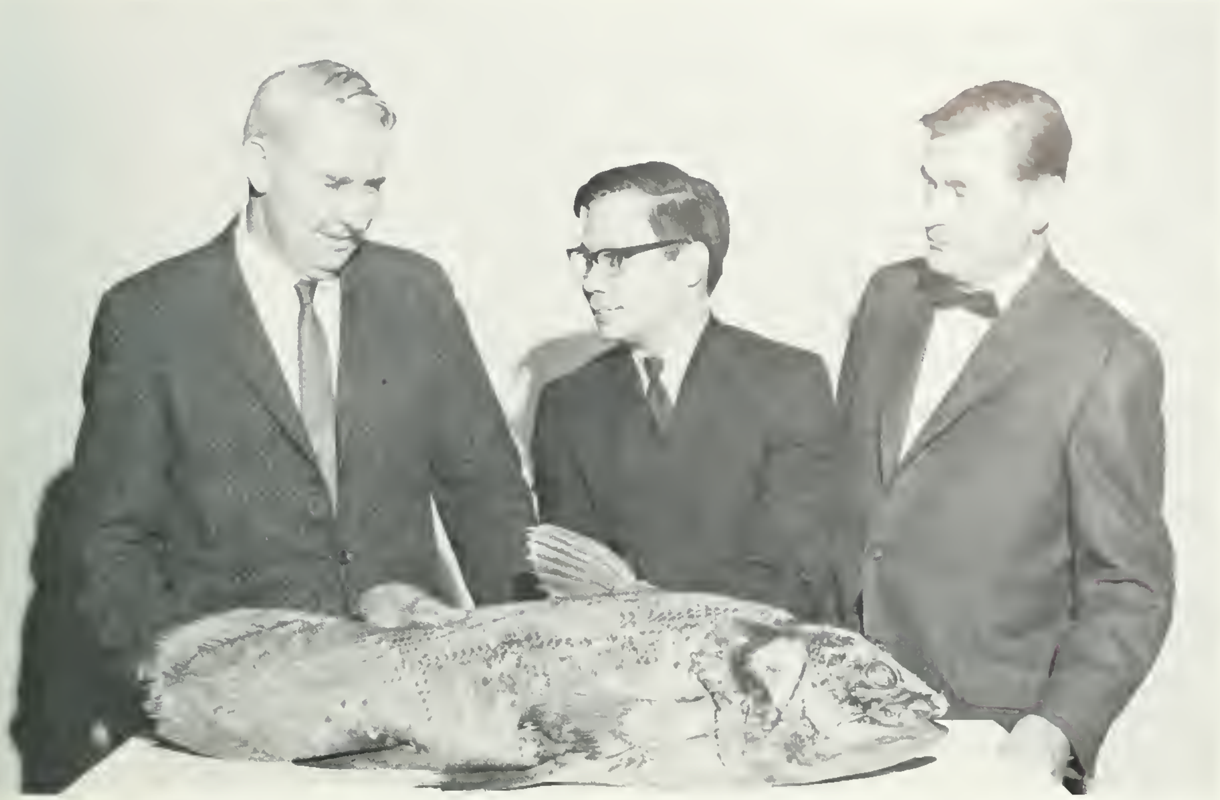
From 1972 through the years of construction and reconstruction, he served as chairman of the Space Committee, a vital link among staff, architects, contractors, and consultants, bringing a quiet keen competence and an awesome capacity for detail that greatly eased the trauma of facilities rehabilitation. In 1973 he was promoted to curator, Division of Birds.

Closing out his formal career on December 31, 1980, he has just completed a three-year term as chairman, Department of Zoology, during this period of massive staff transition. Recognized by his peers as an excellent ornithologist, he has worked most recently on the flycatchers and on ornithological gazeteers of South American countries in cooperation with Raymond A. Paynter, Jr. of Harvard University.

Traylor's managerial and organizational skills have made a lasting impact upon Field Museum. For more than 40 years he has quietly, efficiently, and continually contributed to the Museum in a variety of ways, often not associated with the role of a scientist. Retirement will bring an end to meetings and committee work, result in more time for fishing, and provide full freedom to pursue research on birds, continuing the tradition of careful, detailed work established in his 1937 efforts.

Loren P. Woods joined Field Museum June 6, 1938, as a guide-lecturer in the Department of Education, transferred to the Division of Fishes in January, 1941, and retired as curator of fishes on August 31, 1978. In his 40¼ years at Field Museum, Woods became one of the two or three most knowledgeable ichthyologists in the world. He was a continued resource for information not only on fishes, but on all aspects of marine and fresh water biology. His own research and routine work frequently took second, third, or fourth place to helping students, colleagues, or members of the public

*Melvin A. Traylor, 1956*



*Loren P. Woods (left), shown in 1968 with former curators Karel F. Liem (center) and Robert H. Denison as they admire newly received coelacanth specimen.*

with requests for information.

Typical of the respect in which he was held by his colleagues, a 1978 symposium on damselfishes was dedicated to Loren Woods, "a man who spent many years quietly but effectively encouraging damselfish research." Over the years, *Bulletin* articles by Woods on such diverse topics as coral reef fish and the alewife entertained and informed our members. Loren was an extremely effective field worker, and the fish collections of Field Museum grew dramatically from his activities in the Indian Ocean and Gulf of Mexico. The tensions of life on oceanographic ships often become unbearable. Several people have related to me how effective he was on shipboard in minimizing frictions and facilitating the work of others. His major publication, a revision of the North Atlantic berycoid fishes, appeared in 1973, but his true legacy is in the collections he accumulated and the knowledge he shared unstintingly with two generations of ichthyologists.

Philip Hershkovitz was the late-comer to Field Museum, starting March 10, 1947, as assistant curator of mammals after nearly five years of mammal collecting in South America. In the following years he became, successively, associate curator, curator, and finally research curator, the position he held at the time of his retirement on Sept. 30, 1974, 27½ years after joining the staff. The only difference one could detect in his post-retirement activities was that each day he arrived earlier and worked later. A prolific writer on mammals and an excellent field collector, Hershy, as he is commonly known, has never shrunk from scientific controversy, challenging accepted ideas and interpretations. His views on zoogeography of South and Central America, hair color in primates, and several other ideas will continue to be discussed and debated widely for many years.

The position of research curator of mammals, which he held for 15 years prior to retirement, spared him from many aspects of daily routine, and enabled him to concentrate upon gathering data toward a true magnum opus. Volume 1 of *Living New World Monkeys (Platyrrhini), with an Introduction to Primates,* was issued by the University of Chicago Press in 1977. Totalling 1,117 pages with many illustrations, this has been recognized as "the last word on the subject," "a work of staggering proportions," and "an invaluable reference source for all primatologists." It is indeed so comprehensive that a curious feature of published reviews emerges: each reviewer focuses on only one or two small aspects of the book, as its truly encyclopedic nature overwhelms as a whole. Hershy continues writing the remaining volumes, interspersed with numerous publications on this and that of mammalogy. A legend in his time, Phil Hershkovitz consistently demanded perfection in work from assistants and co-workers, a situation appreciated more in retrospect than at the time of occurrence. A very private individual, deeply interested in music, totally involved in research, Phil Hershkovitz, builder of collections and productive scientist, is a fitting close to this review of retirees.

These brief surveys of careers, totalling 226 working years, fail to do justice to the extent and variety of their contributions to science and to Field Museum. Perhaps this article can convey a sense of the dedication and purpose shown by a group of diversely talented people in building and making use of unique scientific resources. Most certainly, I can emphasize some unusual features of work in systematic biology: that years of experience are required to make major contributions to knowledge of a biological group; that retirement years are frequently a time when major publications are completed; and how important intellectual atmosphere and working conditions are in furthering productivity.

With half of the curators in the Department of Zoology retired to curator emeritus status in the last few years, a new era has started. Of the current staff, Curators R. F. Inger and H. Marx joined Field Museum in the late 1940s, Curator Alan Solem in the mid-1950s, Associate Curators John Kethley, Robert K. Johnson, and Harold Voris in the early 1970s, Associate Curator John Fitzpatrick in 1978, Assistant Curator Donald Stewart in 1979 and Assistant Curators Larry Watrous and Robert Timm in 1980. To this core of career-oriented staff there soon will be two more assistant curators. They will form a new cohort of scientific staff, inheriting vastly greater resource bases than their predecessors, living in a world of short-term grant support, using much more complex scientific procedures, equipped with modern techniques and theories, and offered opportunities and challenges to match or exceed the tradition of collection-oriented research and building established by our curatores emeriti.

*Loren P. Woods (left) with student, about 1968.*

*Philip Hershkovitz (left) with student, about 1968.*

The global environmental problems of today, the continued and growing interdependence of economies of all nations, the human altered basic ecology of the world—all increase the need for research units capable of taking a world view in study. Thanks to the endeavors of previous staff and strong administrative support for these efforts, the Department of Zoology at Field Museum of Natural History has the library and collection resources to make such contributions.

It is the responsibility of both current and new staff to see that ways are found to make major use of these resources in the form of research publication, education, and exhibition —three basic functions of Field Museum of Natural History. We will be advised and helped by our distinguished curatores emeriti, who after 226 paid years at Field Museum, are spending many more years on the projects they were too busy to complete, or wanted to start, but couldn't. ☐

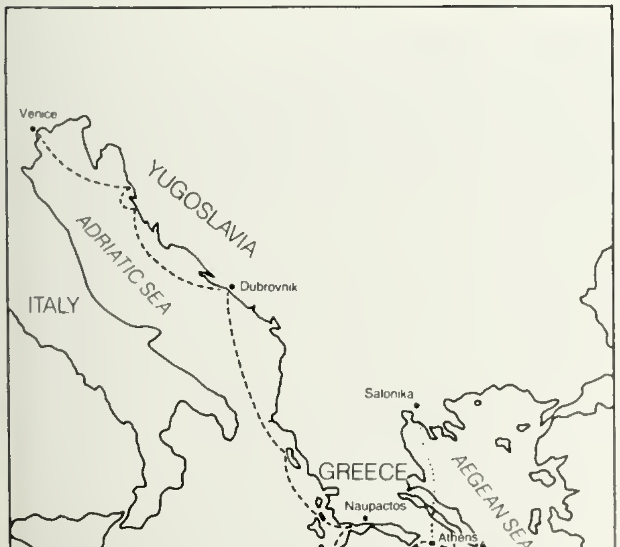
*Venice*

# Venetians and Minoans

## *A Voyage of Discovery*

Field Museum's September 1980 Tour to "The Classical Lands"

*Text and Photos By* DONALD WHITCOMB



The *M.S. Stella Maris* awaited our tour group in a most appropriate place: just outside the Arsenal, in Venice, for we were about to embark on a tour during which we would see and contrast the archeological remains of two important Mediterranean powers: medieval Venice and ancient Greece. Our visit to *La Serenissima*—"the most Serene Republic"—had been too brief, but long enough to gain a feeling for the center of this medieval empire of the sea; and now we embarked just where Venetian galleys had departed for so many centuries.

In a way the arsenal was a foretaste of things to come: Directly outside its gates are three lions, one from the Greek island of Delos and two that once adorned the harbor of Piraeus and the sacred way leading from it to Athens. Lions would accompany us throughout our tour, from the numerous lions of St. Mark, which identified the extent of the Venetian commercial

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*Donald Whitcomb, coleader of the tour, is assistant curator of Middle Eastern archeology and ethnology*

Dubrovnik

world, to the famous Lion Gate of Mycenae, which symbolized the far earlier world of the Mediterranean.

We left Venice, the city of the sea, and retraced the route through which she had exerted her influence over the entire eastern Mediterranean. Visiting the small ports of Rab and Zadar, nestled among the numerous islands of the Yugoslav coast on the Adriatic, we could easily imagine the Illyrian pirates who troubled the Romans and, centuries later, similar piratic groups who harrassed the Venetians. But the competition which the Venetians encountered was also of a more legal variety at the commercial entrepôt of Dubrovnik, or Ragusa, as it was known in medieval times.

The galleys of Ragusa, called *argosies*, were very nearly as successful as those of Venice in the oriental trade. The well preserved old city gave us a vivid impression of the medieval milieu in which this trade grew, a trade which extended back at least to Roman times, but which flourished from the 13th century onwards as Europe was involved with the Near East via the crusades. If the transport of soldiers was profitable, the merchants of southern Europe soon discovered that the products of the more advanced oriental cultures, especially spices transshipped from even more distant lands, were even more profitable.

The resort island of Corfu gave us our first view of the resources and energy expended by the Venetians to establish and maintain their commercial empire. This was an empire in the true sense of the word, where political, military, and, above all, bureaucratic subsystems were organized into an entity controlled by Venice. Henceforth, at almost every stop on our cruise around the Peloponnesos and through the Greek Islands, we would find preserved a fort attesting to the extensive defensive links required to control this empire. One of the most important of these forts was Naupactos (medieval Lepanto), site of the last decisive victory of the Venetians (A.D. 1571) before losing their empire to the Turks. Here our tour set off to explore the earlier maritime civilizations of Greece as we visited the ruins of Delphi.

According to Greek legend, the mysteries of Delphi, with its renowned oracle, were introduced by Apollo, who arrived there "in the company of men from Knossos." The men of our

*Tour members visit the Minoan Palace, Knossos.*

next stop, Nestor's beautiful palace on the hilltop at Pylos, were immortalized by Homer for their role in the earliest recorded battle of European and Eastern peoples—the "crusade" against Troy.

It was on Crete that we found the first dramatic overlap of the two maritime empires we were following. Although our visits to the ports of Chania and Rethymnon revealed that the omnipresent Italians had been active on Crete, it is the Minoan maritime civilization of the second millennium B.C. for which this island is justly famous. The Minoans, who flourished about 1500 B.C., and their successors, the Mycenaeans, based on the Greek mainland, conducted a lively commerce with the Levantine coast and Egypt and they wielded enormous power in the eastern Mediterranean. Minoan rule has been considered nonviolent and termed a *thalassocracy* ("supremacy on the seas"). We later flew back to Crete for a more detailed examination of Minoan archeology at Knossos, Phaistos, and several subsidiary centers, almost all of which are located on the sea.

As we roamed around the palaces of the Cretan kings (called *Minos*, perhaps a title like the Venetian title *doge*), we could imagine the ladies in fine dresses and the luxury of the court depicted in the frescoes, perhaps not too dissimilar from the decadent luxury of 16th-century Venice. Just as the persona of the doge was purposefully minimized by the laws of the Venetian republic, so too, the exploits and personal character of the Minos seem never to have been recorded. Indeed, one of the Minoan centers has recently been described as being "like a Minoan Venice," although comparing Venice's Piazza San Marco with a typical Minoan court and its surrounding palace, ritual center, and loggias, is somewhat forced.

*Athenian Treasury, Delphi*

But both the Venetians and the Minoans did develop extended maritime empires in which commerce was the main purpose and political conquest by force a secondary means. Like Venice, the cities of Crete found protection in a strong fleet controlling the sea routes, harbors, and naval bases; neither the early Venetians nor the Minoans had specialized warships or war fleets. Though the role of the military in ancient Crete is currently debated, it is tempting to view the Minoans as nonwarlike traders and to see the Mycenaeans, who succeeded them, as heritors of this commercial system backed by more forceful means. It is tempting, too, to explain both

*Palace of the Despots, Mistra*

*A church at Kritsa, Crete*

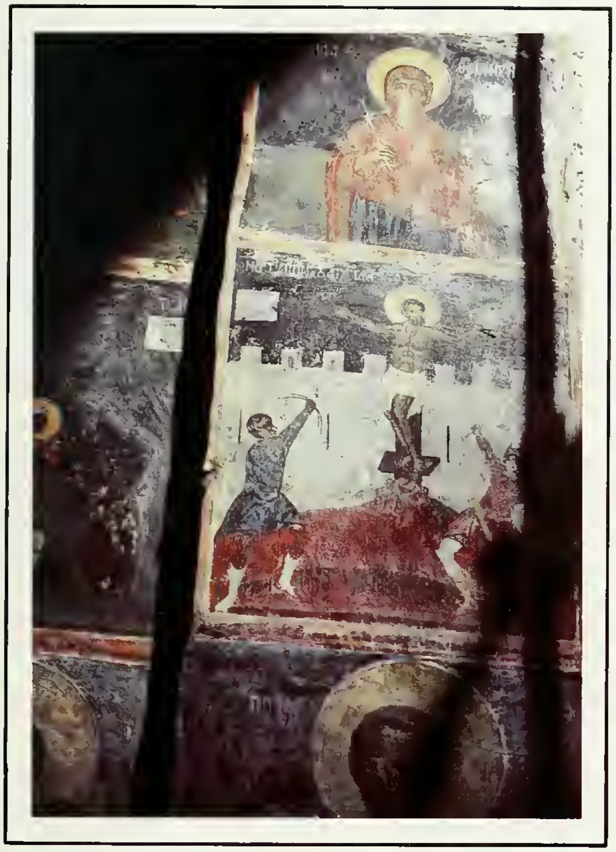
situations in terms of the "protection costs" identified by the American historian Frederick Lane, who explored what happens when governments, using military systems, interfere with commerce.

We sailed from Crete to the nearby island of Santorini, visiting the amazing ruins of Thera (Akroteri), buried by a volcanic eruption 3,500 years ago. If the site of Lepanto may be considered the dénouement of Venetian civilization, the cataclysmic destruction of this Minoan town likewise represents the beginning of the end of this commercial empire. It was difficult not to be reminded of the violence of Mt. St. Helens, reflections made more vivid by a slight temblor during our last night in Crete.

Our last stop on the way to Athens was the island of Naxos, which had been the Venetian duchy of Naxos. Our route recapitulated the story of Theseus and the labyrinth: According to Greek legend, Theseus had been sent to Crete as part of Athen's tribute to Minos; but Theseus killed the Minotaur and escaped with the Princess Ariadne, whom he rather unchivalrously left at Naxos before continuing on to Athens. Theseus subsequently ruled Athens and laid the foundation for the power and prosperity of that city-state. It is suggested that the Greek legend refers to the violent breakup of the Minoan empire and the development of the early city-states on the Greek mainland.

This transfer of power to the mainland gave rise first to the Mycenaean civilization,

*Naupactos harbor*



*Church frescoes, Mistra*

epitomized for us by the impressive fortified hilltop ruins of Mycenae and Tiryns, excavated by Heinrich Schliemann a century ago. Both the art and the artifacts of the Mycenaeans reflect the continuation of contacts with the East, especially with Egypt. Great numbers of Mycenaean artifacts have been found in Egypt, and actual depictions of Mycenaeans have been found in private tombs there, such as the tomb of the Vizier Rekhmire (*ca.* 1450 B.C.). As our fast cruise ship moved from port to historical port, we became aware of the achievements of the ancient and medieval sailing ships who tied these disparate lands into a great international network.

Although the majority of stops on our tour illustrated the interactions of men—medieval as well as ancient—with the sea, we also had the chance to visit the high landlocked region of Mani in the middle finger of the Peloponnesian Peninsula, and to explore the ruins of the city of Mistra, the Sparta of medieval times. Perhaps significantly, this medieval site had been established by Frankish knights, becoming a remote kingdom and later a refuge for the Byzantine despots.

The fortunes of this "second capital" were often tied with those of the port of Monembasia. The day we spent visiting these two well preserved medieval towns, dating mainly to the 15th and 16th centuries, gave us a real feeling for the conditions of life at that time, even though they were revealed through archeological remains superficially similar to those of much earlier periods.

A final highlight of our tour was a flight to Salonika, in northern Greece, where we visited Hellenistic Pella, the capital of Philip and Alexander of Macedon. In addition to the extensive, beautifully preserved remains of the ruins of the capital, we visited in the Archaeological Museum of Thessaloniki the newly opened exhibit "The Search for Alexander," which contains the remarkable objects from the tombs of the Macedonian royalty, including the presumed tomb of Philip the Great. Just as we had followed the history and archeology of the early commercial empires of the eastern Mediterranean, we were pleased to know that Alexander, that great empire builder, will, in a sense, return the compliment and follow us back to Chicago in a few months, when this exhibition will be mounted at the Art Institute. The Field Museum tour of Greece and the Adriatic gave an opportunity for museum members to study the context of these treasures and the cultures, both earlier and later, illustrating the continuity of aspects of Mediterranean civilization.

*Temple at Cape Sounion*

Audrey Faden

*Beach scene, Seychelles*

# Kenya and the Seychelles

September 12–October 3
Tour Price: $3,750

There Is Now, as there has always been, an aura of mystery surrounding Africa. Tropical islands and the coast, endless palm-fringed beaches, snow-capped mountains on the equator, jungle primeval, savannah sun-baked plains. They are all a part of East Africa, the home of one of our planet's last great natural dramas. The wildlife . . . the stately processions of giraffe—dark centuries silhouetted on the African horizon. Prides of lion—stalking the plains and still lauded as the king of beasts. The beautiful and rare leopard, the elegant cheetah and surely one of the wonders of the world, the magnificent migration of wildebeeste and zebra. Sadly, time and civilization move inexorably onwards so we hope to welcome you to Kenya and the Seychelles with Field Museum Tours in 1981.

Itinerary Sept. 12: Evening departure from Chicago's O'Hare Airport via British Airways to London. 13: Morning arrival in London with time to rest before evening departure for Nairobi. 14: Morning arrival in Nairobi and transfer to Nairobi Hilton Hotel. Evening welcome party and lecture by member of the East Africa Wildlife Society. 15: Drive through Kikuyu country for overnight stay at Mt. Lodge Tree Hotel, the newest of the well-known Tree Hotels, designed for optimum game viewing from the comfort of your balcony. 16: Drive north and cross the equator to the Samburu Game Reserve. Overnight at Samburu Game Lodge. 17: Full day game viewing at Samburu Game Reserve. 18: Drive south to spend the day at the foot of Mt. Kenya at the luxurious Mt. Kenya Safari Club. 19: Journey to Lake Naivasha, a bird-watcher's paradise. Overnight at the Lake Hotel. 20: Drive through the Masai Mara Game Reserve for two days of game viewing by minibus in the Great Rift Valley. Overnight at the Governor's Camp. 21: Full day at Masai Mara Game Reserve, including a game walk. 22: Return to Nairobi and the Nairobi Hilton Hotel. 23. Journey to Amboseli National Park, dominated by the spectacular Mt. Kilimanjaro. 24: Morning lecture by research naturalist discussing studies of wildlife behavior. Afternoon trip to Tsavo West. Overnight at Ngulia Lodge. 25: The safari continues through the plains of Tsavo to Taita Hills Lodge for lunch. Continue to the port city of Mombasa on the Indian Ocean. Overnight at the Leopard Beach Hotel. 26: Morning visit to Shimba Hills Reserve. Afternoon free. 27: Morning departure for Mahe in the Seychelles Islands. Afternoon arrival at Reef Hotel.

28–30: Three days in the Seychelles includes a full day excursion by air to Praslin Island to visit Vallee de Mai and by boat to Cousin Island to visit the internationally renowned bird sanctuary. Optional full day excursion by air to Bird Island. Oct. 1: Free day in Mahe. Evening flight to Nairobi, late night flight to London. 2: Morning arrival in London. Free day to relax and explore on your own. Overnight at London Embassy Hotel. 3: Late morning flight to Chicago via British Airways.

FIELD MUSEUM TOURS

For a brochure on this or any of our other tours please write or call the Tours office at Field Museum, 322-8862.

Travel Plans International

*East meets West*

# Papua New Guinea

May 1–17
Tour Price: $4,461

Papua New Guinea is unique on the face of the planet Earth. For millenia (or untold time) a diversity of contrasting cultures have flourished here within small areas because of the isolation imposed by rugged terrain of mountains and jungles, and because of hostilities between the many different peoples. Largely unknown to each other and to the outside world they coexisted, each in a communal environment sufficient unto itself. Only since contact with modern industrial society has this isolation been broken, making it possible for visitors to explore and exclaim over the natural wonders of this Edenlike paradise.

It is one of the most remarkable—and last—reservoirs of animal, reptile, insect, and bird life to be found anywhere. But most of all, Papua New Guinea presents a variety of cultures and art of such freshness and color it holds a fascination beyond all else. Each province has its own charm, whether it be the all-green towering Eastern Highlands, or the expansive vistas of the Sepik watershed. To travel through the continuing contrasts of this ever-changing land is to experience a travel adventure that broadens the mind as it enriches the soul. To go from the beginnings of the Space Age to the remnants of the Stone Age in the course of a couple of days cannot fail to be an adventure of mind-bending proportions.

The Sepik River is a monster waterway draining a vast area of grassland, swamp, and jungle in its serpentine circuit. For five memorable days we will cruise the Sepik, reaching into the past in remote regions where the villagers still travel in traditional dugout canoes. They still reside in enormous tree houses though not for the long ago purpose of escaping head-hunting raiding parties. They still make and use fanciful owl-head pots and carve crocodiles and hornbills, symbols of fertility and life. They continue to keep their most treasured possessions hidden away or buried, only bringing them out on special occasions. And they still create some of the country's most artistic artifacts.

Our lecturer, Dr. Phillip Lewis, curator, primitive art and Melanesian ethnology, will escort the tour from Chicago, and share his knowledge of the varied arts and cultures of Melanesia. In addition, our Sepik director, Jeff Leversidge, a well-known personality on the Sepik and Ramu Rivers, and very knowledgeable about the diverse cultures, arts, and customs of the Sepik regions, will lecture the group during the cruise and shore excursions.

Accommodations on board the newly refurbished *Melanesian Explorer* are modern and comfortable. Passengers are housed in air-conditioned twin-bunked cabins, each with private bath. Above the cabins is a lovely dining and lounge area, while the top deck, aft, is fitted with lounges and chairs so that passengers may watch the Sepik water world go by in pleasurable ease.

To ensure your reservation, call or write the Tours office now.

*Machu Picchu*

Hermann Bowersox

## Peru and Bolivia: 1981 *October 16 to November 1.* *Tour price: $3,100*

A Different Experience! A Different World! From the fabulous Incas, through Spanish Colonial times to the modern cities of today — yet maintaining its Latin charm. You'll love the green fertile valleys along the sandy desert coast of Peru; the highest railroad in the world; crossing Titicaca, the world's highest navigable lake by hydrofoil; flying over the Nazca plains. Our tour includes the fascinating cities of Lima, Cuzco, Trujillo, Puno, a train trip to fabulous Machu Picchu, and four full days in La Paz.

Dr. Alan L. Kolata, visiting assistant curator of South American archeology and ethnology, and project director, Field Museum Expeditions to Bolivia, will accompany the tour members during the entire trip. Dr. Michael E. Moseley, associate curator of Middle and South American archeology and ethnology, who for the past ten years has directed large-scale projects on the north coast of Peru, will join the group when we visit his area of research. We will also have an opportunity to see and learn about Dr. Kolata's work at Tiahuanaco. For more information call or write Field Museum tours. Direct telephone line: 322-8862.

Stanton R Cook, courtesy *Chicago Tribune*

## China Tour

### May 17–June 5

Five spaces remain on this extraordinary tour. For detailed itinerary and other information call *Tours* direct line: 322-8862.

# *Journey to the Holy Land and the Red Sea*

## A cruise on the Red Sea aboard the *Stella Maris,* followed by a stay in Cairo and Israel

### March 12–26

*Petra, Jordan*

You Are Invited to participate in an extraordinary itinerary that affords a wealth of visual and intellectual experiences unmatched in the world of travel:

Following a transatlantic flight, participants will land at Cairo and transfer to the port of Suez to board the cruise ship, *Stella Maris,* and sail leisurely on a Red Sea cruise. Ports of call include several along the shores of this ancient sea, where centuries have made little change. From each port, excursions will reveal sites of unforgettable beauty and grandeur.

The overnight excursion to Luxor will recall the golden age of Egypt's power when the wealth of Thebes was showered upon the god Amon-Ra. A tour of ancient Petra in Jordan will reveal a site in an incomparable setting, with an opportunity to visit the Monastery of St. Catherine, built in the 6th century on Mt. Sinai.

The cruise will be followed by two nights in Cairo. Hotel accommodations will afford views of the pyramids of Giza. From Cairo, tours will be made to Memphis and Sakkara, the pyramids of Giza and the Sphinx, and the Egyptian Museum of Antiquities. Following the stay in Cairo, fly to Israel for a four-day visit with accommodations at the Jerusalem Hilton. In Israel, the tour program includes visits to Mount of Olives, the Old City and sites of Jerusalem, Masada, Bethlehem, and Jericho.

Tour lecturer will be Donald S. Whitcomb, assistant curator of Middle Eastern archeology. Dr. Whitcomb, who also led Field Museum's recent tour to Greece, has had field excavation experience in Egypt, Oman, Iran, and Syria, as well as museum and research experience: as consultant in Islamic archeology, Comprehensive Survey of Saudi Arabia; and as research assistant for the Comprehensive Survey of Saudi Arabia, 1976. (Included in this tour's itinerary is the Red Sea port of Quseir al-Qadim, a site where Whitcomb is in charge of continuing excavations.)

The *Stella Maris* is a ship of 4,000 gross tons and 297 feet in length. Originally built in the early 1960s, it was completely rebuilt in 1965 as a one-class elegant cruise yacht.

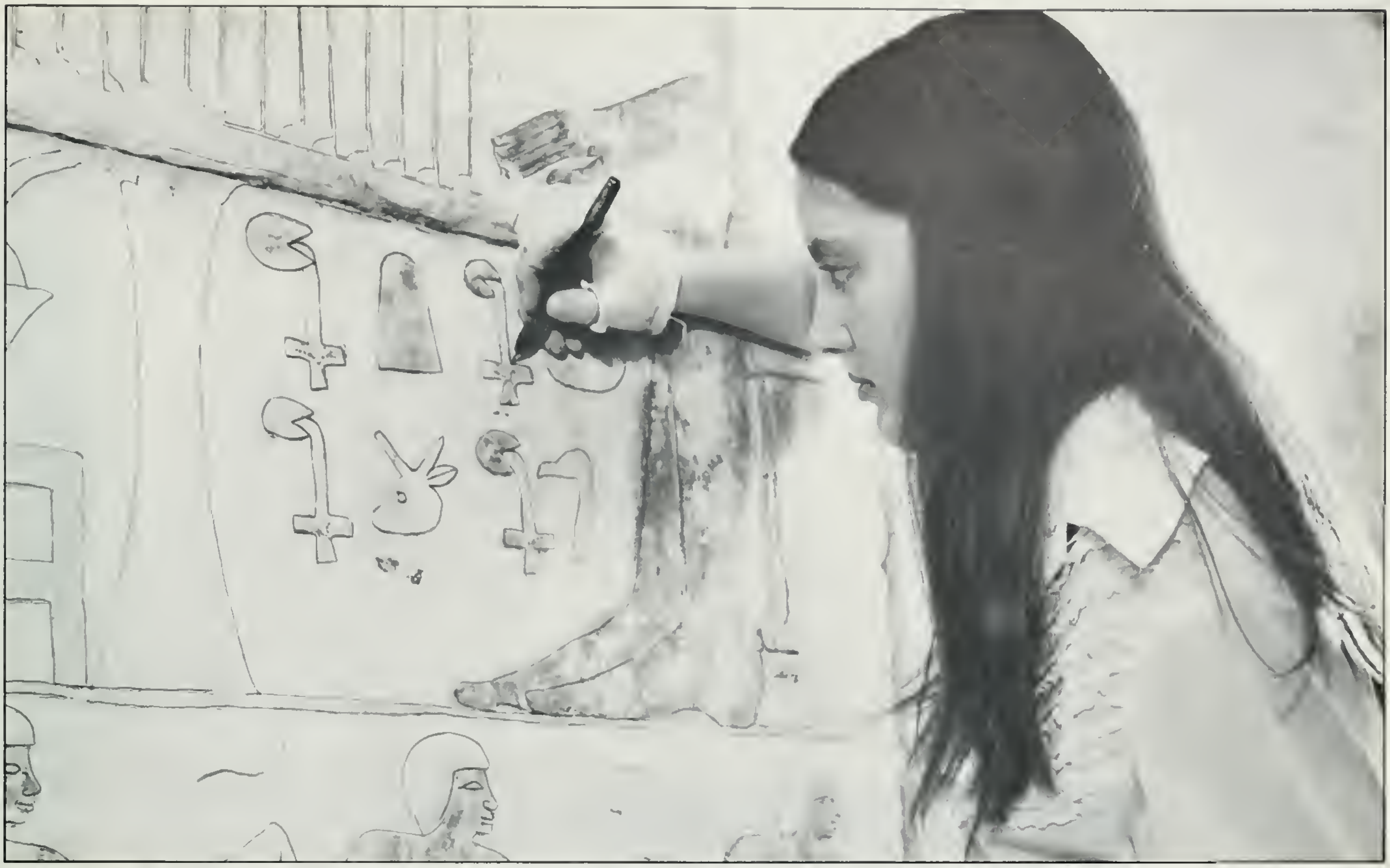
The price of this tour depends upon the type of accommodation chosen: $3,625 to $3,995 based upon double occupancy. A few large staterooms aboard the *Stella Maris* will accommodate a third person in an additional upper berth at a rate of $2,925. For a full breakdown of tour rates, itinerary, and other details, please call the tours office (322-8862) or write for a brochure.

# BEHIND THE SCENES

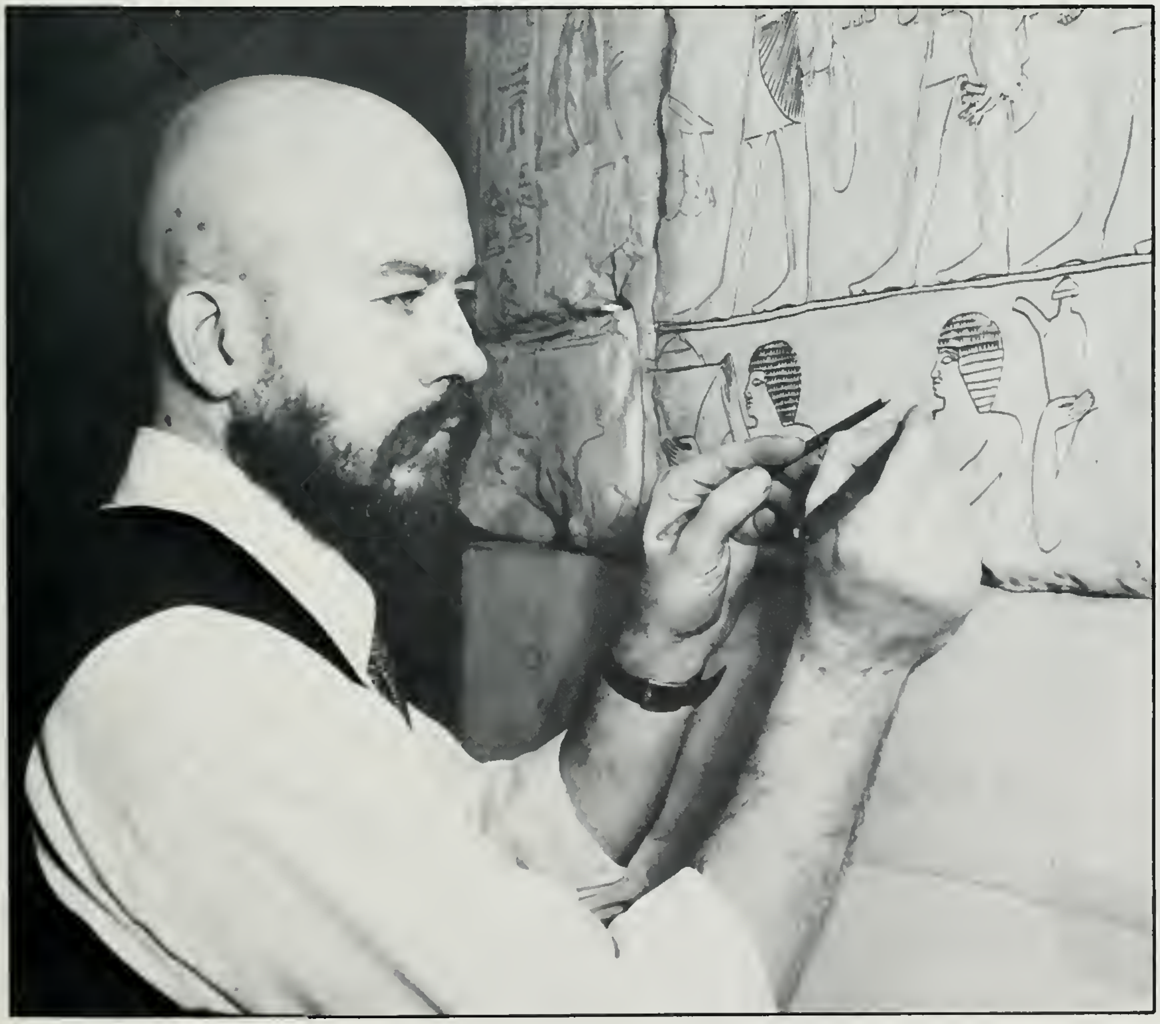
Dave Walsten

The Egyptian Hall *(Hall J), one of the Museum's perennially popular exhibits, is the site of the action shown on these two pages. Above, Donald Whitcomb, assistant curator of Middle Eastern archeology and ethnology, inspects the offertory chapel of an Egyptian nobleman who lived a thousand years before King Tutankhamun. The chapel, along the west side of Hall J, has been viewable only through windows since it was installed many years ago. Work is now under way, however, to provide public access into this chapel and a similar, adjacent one.*

*The fascinating hieroglyphs and relief decorations of the two chapels have never been thoroughly analyzed. By means of carefully rendered tracings (opposite) and the aid of specialists at Chicago's Oriental Institute, Whitcomb hopes to unravel the story behind these intriguing inscriptions of more than 4,000 years ago.*



Dave Walsten



Dave Walsten

*Egyptian tomb project artist Sarah Woodward and senior scientific illustrator Zbigniew Jastrzebski trace tomb art and inscriptions on prepared acetate film. Their copies are then to be studied by Egyptologists and deciphered.*

Learning Museum continues with:

# West African Art: Power and Spirit

by Anthony Pfeiffer
*Project Coordinator*

Made possible by a grant from The National Endowment for the Humanities, a federal agency.

Early European Explorers found Africans to be hordes of savages. Forgetting their own origins, Europeans had no frame of reference for what they saw as a "dark continent." They projected their own raw, untamed, and wild psyches onto the face of West Africa. Both the land and the people were viewed as literal examples of living prehistory, irredeemably backward and laughably quaint. Polygyny, for example, was initially represented as an exotic marriage custom, devoid of political and economic significance. Since Africans were seen as sub-human—at best, barely human, it was easy to rationalize taking them as slaves.

*A stone monument bearing the image of an ancient tribal chieftain in the garden of the Nigerian National Museum. Oblivious to the grandeur of the past, and seeming to symbolize the passing of ancient traditions, a guard strolls over [illegible]*

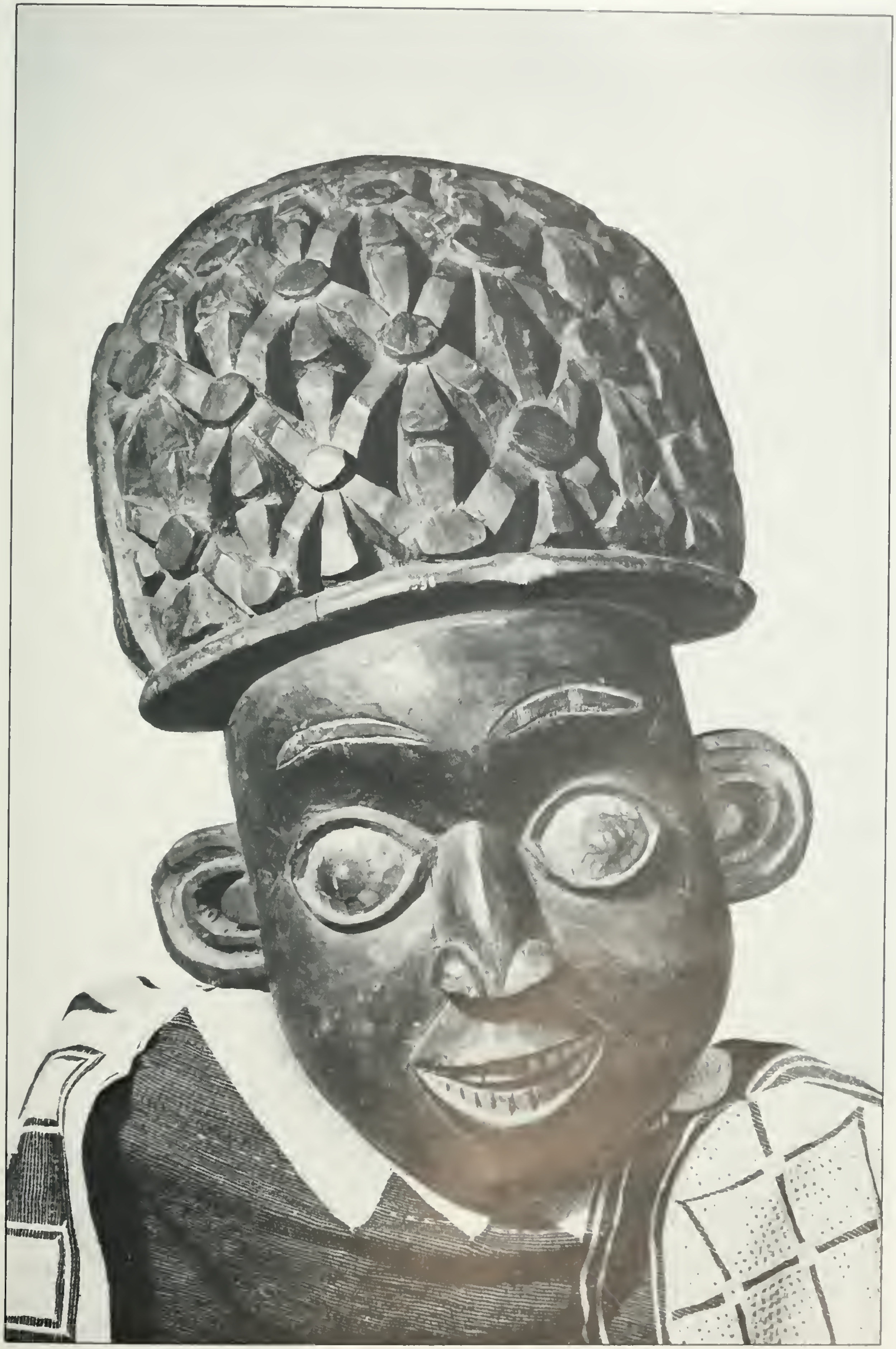
European settlers, however, came to realize a very different Africa. They reported sophisticated systems of worship, kinship, and kingship. A king's many wives were no longer seen as meaningless royal prerogatives, perhaps indicative of animalistic and superabundant sexual appetites. It was recognized that the king was bound, through his wives, to all important ancestral lineages throughout the tribes he ruled. His wide network of connections to both the living and the dead, in turn, legitimized his rule and specified the scope of his power over and obligations to his people. Still, Africa and Africans were consistently and stubbornly underestimated.

Consider the famous bronzes of the Benin Kingdom in Nigeria, for example. The skill and craftsmanship that went into fashioning the heads could not be denied. What was denied, however, was that they were made by Africans. After all, how could such artistic achievement have emerged in such a primitive setting? The very idea was impossible. Yet eventually, the bronzes of Benin were accepted as authentic African art and today are among the most striking objects on view in Field Museum's African culture exhibits.

Although it was finally recognized that

**NEH Learning Museum at Field Museum**

*The NEH Learning Museum program is a three-year sequence of learning opportunities focused on the Museum's outstanding exhibits and collections and designed to give participants an opportunity to explore a subject in depth. Each unit of study consists of one or more special events, a lecture course, and a seminar for advanced work. Special events are lectures by renowned authorities or intrepretive performances and demonstrations. Course members receive an annotated bibliography, a specially developed guide to pertinent museum exhibits, study notes for related special events, and access to select materials from Field Museum's excellent research library. In-depth, small group seminars allow more direct contact with faculty and Museum collections.*



*A wooden mask-headdress from Babanki, Cameroon. Acquired by Field Museum in 1925, cat. no. 175590, 29 x 69 cm (11½" x 27"). Such adornments were prized when actually in use but had no function or value as state art objects.*

*Art retains superficial traditions of form and style, but much of today's work is fashioned for the tourist. Here we see a Cameroon sculptor.*

Benin bronzes were fine art of native manufacture, they were defined as art strictly in the European sense. Form, style, and workmanship were acknowledged and admired, but the objects had been torn from context, which in the broadest overview was the entire African continent. More specifically, this context was West African and, in strict focus, was particular tribes and [illegible].

Africa. A vast continent, it is at least three times the size of the United States. Largely in the tropics (the equator dissects it), Africa is a great [illegible] ation of 2,000 feet [illegible] larized tropical [illegible] 7 percent of the continent [illegible].

A [illegible] logists lacked any other [illegible] of humankind. [illegible] the origins and flourishing [illegible] cities, could be told within Africa's continental confines. Vast areas and low population densities led to more distinct peoples and cultures than in any other continent.

Phoenician mariners were said to have "discovered" Africa in 600 B.C. It wasn't until A.D. 700 that merchants from Carthage carried on the famous "silent trade" with peoples of the northwest coast. Merchants left their goods in piles not far from the shore and returned, after a few days, to find them gone, replaced by mounds of indigenous products. Thus, exchanges were made without barter or any form of person-to-person contact.

Seven hundred years later, in A.D. 1400, Portuguese exploration of Africa began. Initial European contacts were primarily limited to coastal areas, and the map of Central Africa remained virtually blank until Livingston went on his fabled journeys (circa 1850). The well known depradations of slavery were in full force by this time. Slaves faced terrible hardships en route to and in strange lands.

Art, too, became distorted out of context, just as the persons removed from the lands in which their traditions were founded. It may be difficult for western cultures to comprehend art as part of daily spiritual, social, economic, and political life, but in traditional West Africa, art forms played many functional roles. Idols were impaled with hundreds of iron spikes to eliminate rivals and enemies—attempted "murder by remote control" as it was characterized in the April-May, 1943 *Field Museum News* (former name of the *Bulletin*). Twins were sculpted to placate the angry spirits that caused the misfortune of multiple births.

Lovely carved wands were used to figure out who or what caused problems and to divine the future. The togetherness of family and tribes was symbolized and asserted in carvings, sculpture, and masks used in dances. Art was a medium through which all aspects of life were played. The meaning of art was in motion, context, and setting. Art was so much a part of mainstream living that often no term or phrase identified it as a distinct entity.

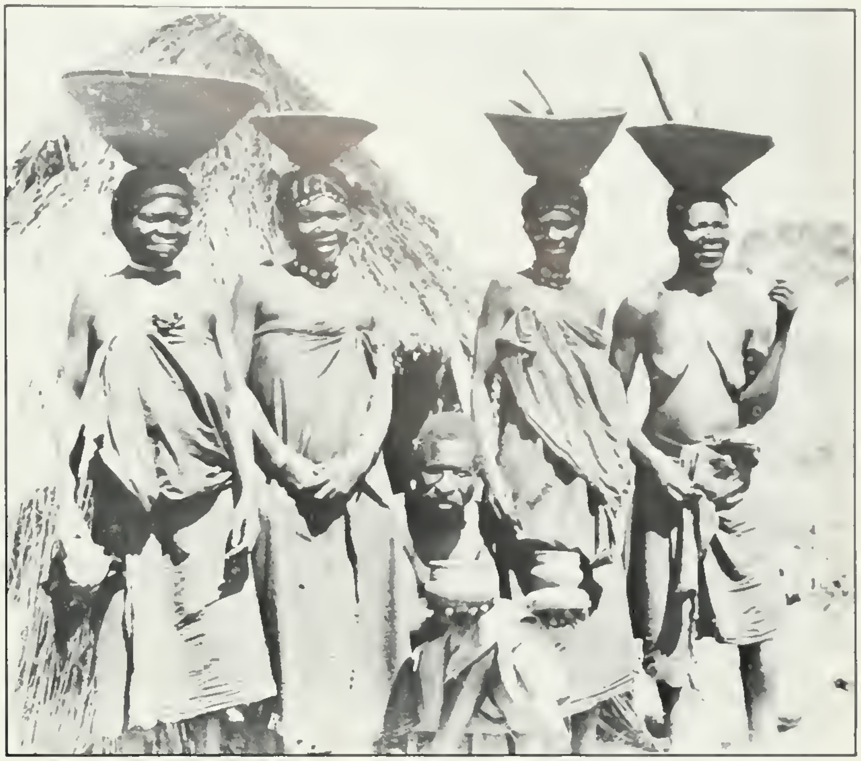
Artists were supported by chiefs, as were warriors, bureaucrats, and others essential to day-to-day tribal life. Medicine men were often artists. The magic of their art and the art of their magic were one and in tune with the environment. The bird whose call became insistent and shrill when rain was about to fall pleased the medicine man. As one medicine man in Portuguese West Africa put it: "I like to hear the call of the rain bird, for then I can safely perform my magic to make rain and the people will not be disappointed."

This world of artist, art, people, chiefs, and environment as one is largely gone now. The materialistic values of western society are almost everywhere in Africa replacing traditional spiritual ones. A potter molds pots in the time-honored way, but glazes and fires them using modern technology. The poet writes in English or French, but sings poems as oral literature has always been sung. Chiefs and kings no longer support the artists, who instead seek patronage from markets, tourists, the state, and the middle class. The new art forms, while retaining some traditional influences, are no longer embedded in the fabric of tribal life.

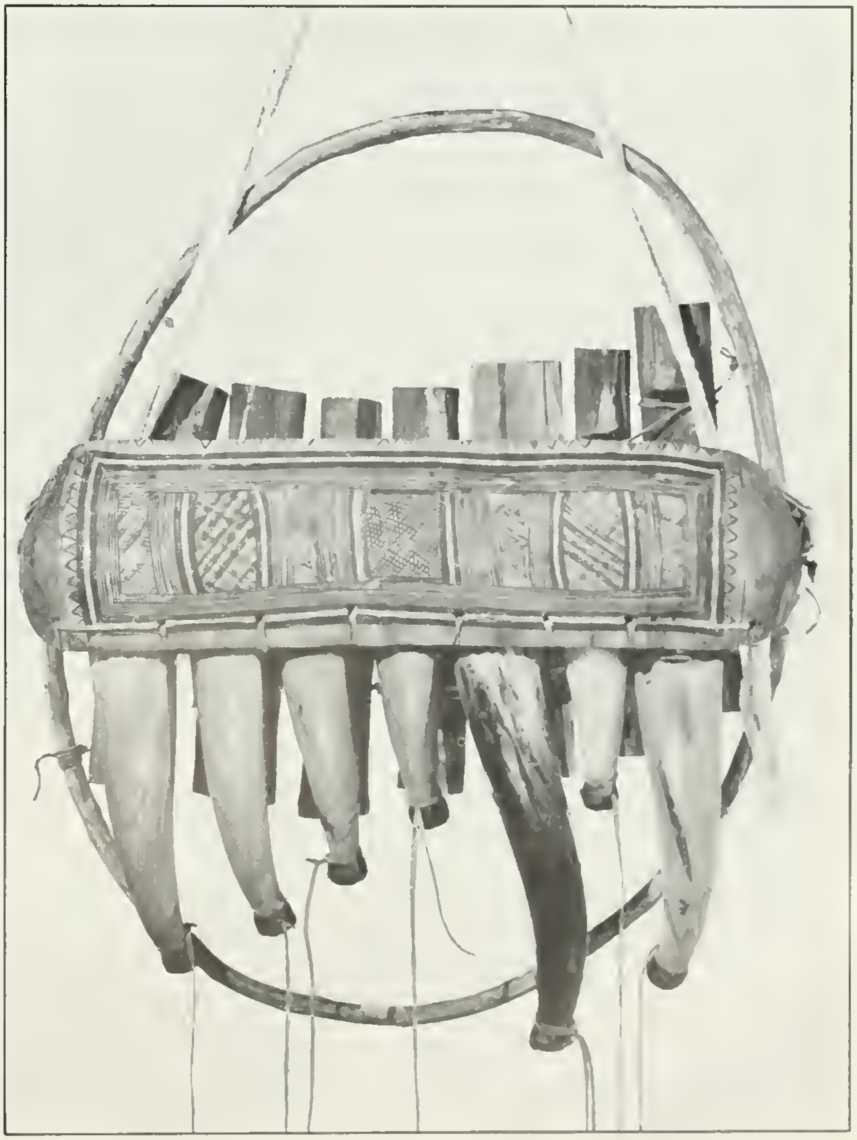
Traditional dance, for example, once emphasized hierarchies of age, status, and sex; acted out history and legend; taught people their places and kept them there; and made for satire and the release of feelings. Now dance is theater. In performances for strangers, sacred parts are left out, while crowd-pleasing elements are amplified. The ecstacy induced by hours of seemingly monotonous, repetitious movements is gone because the build-up to it ignores the nonparticipant.

*West African Art: Power and Spirit* invites you to recreate art objects in their living contexts; to see how figures and idols embodied the ultimate control of kings over their tribes; to discover how art personified the ancestral spirits, and how many artifacts were meaningful only in concert with ceremonial dance and music. Follow the development of West African art from traditional context to modern setting. Ethnographic films are used to explore the dynamic aspects of traditional art. The course of study begins on February 5, and details are available in the Winter, 1981 *Courses for Adults* brochure.

You are also invited to attend *AFRO-BLUE,* a related special event, on February 28, 1981. *AFRO-BLUE* is a celebration of West African artistic heritage in American music, particularly jazz. The roots of jazz lie in the African musical experience. This strong musical tradition survived the desolate journey to the new world and slavery, blending with European influences to be transformed into a unique art form. Join important Chicago musicians in concert and see films representative of the African imprint on American music. See the February *Calendar of Events* for details. □



Above: *Taken during the F. H. Rawson Field Museum Ethnological Expedition of 1929-30, this photo gives the flavor of traditional art in Africa. An Angolan potter, holding his wares, poses with four wives. Although chiefs might have dozens—even hundreds—of wives, it is a measure of the potter's status and of his importance to the tribe that he, a mere artisan, has as many as four.*



Below: *Although drums first come to mind in connection with African music, traditional performances included a great variety of instruments. Shown here is a portable xylophone, with ox-horn resonators, made by the Bura people of northern Nigeria.*

# OUR ENVIRONMENT

### Black Rhino Endangered

Hunted extensively for its valued horn, the African black rhinoceros *(Diceros bicornis)* has been determined by the U.S. Fish and Wildlife Service to be an endangered species. The service believes there may be fewer than 15,000 black rhinos remaining in the world.

One of five species of rhinoceros occurring in Africa and Southeast Asia, the black rhino is the most numerous of the world's rhinos and yet appears dangerously threatened with extinction. In Kenya, probable losses over the last five to eight years have been figured at 95 percent of the black rhino population in Tsavo National Park, 85 percent in Amboseli, and over 90 percent of those that once survived in Meru National Park.

These dramatic losses are due primarily to trade in the species' parts and products. East African statistics on the legal export of rhino horn, which are carved into dagger handles or used in powdered form for medicinal purposes or as an aphrodisiac, show that 1.56 tons were exported annually from 1950-71. From 1972-76, legal exports jumped to 4.2 tons annually. In one instance, a single rhino horn reportedly sold for approximately $15,000.

The biology of the black rhino may also be contributing to its demise. For a species that exists largely as solitary individuals at a naturally low density, the severe declines cause further problems by reducing the probabilities of reproduction. Also, the rhino is easy to stalk and those animals that are left show evidence of extreme disturbance in response to harassment.

The proposal to list the black rhinoceros has drawn mainly supportive comments. The only nonsupporting comment came from Safari Club International, which recommended threatened status for the species throughout most of its range except Kenya, where they agree the black rhino is endangered. According to the service, the black rhino is in danger of extinction throughout all or a significant portion of its range.

Although the black rhinoceros is protected under the Convention on International Trade in Endangered Species of Wild Fauna and Flora, listing under the Endangered Species Act will provide additional prohibitions against importing the species or its parts and products into the U.S., as well as restricting transportation or sale in interstate or foreign commerce. Listing under the act will also allow the U.S. to provide, if requested, technical expertise for establishing management and recovery programs and funds to assist in the implementation of such programs by appropriate foreign governments.

### Whole Dinosaur Eggs Found

A Shell Oil seismic party working about 55 miles west of Great Falls, Montana, has discovered the first whole dinosaur eggs ever found in North America. The eggs were found in a geological formation that is a mixture of mudstone and limestone laid down more than 80 million years ago.

### Five of Ten Most Numerous Bird Species Found to Be Pests

According to the National Wildlife Federation, of the ten bird species most frequently sighted in the United States, five are considered by many to be pests. The national Wildlife's top ten include starlings, mourning doves, western meadowlarks, horned larks, robins, crows, red-winged blackbirds, house sparrows, barn swallows, and common grackles. Of that list, starlings, crows, redwings, sparrows and grackles have a reputation as pests. There may be more redwings in the United States than any other bird, at least it was the most often sighted species in a recent survey.

### The Ubiquitous Housefly

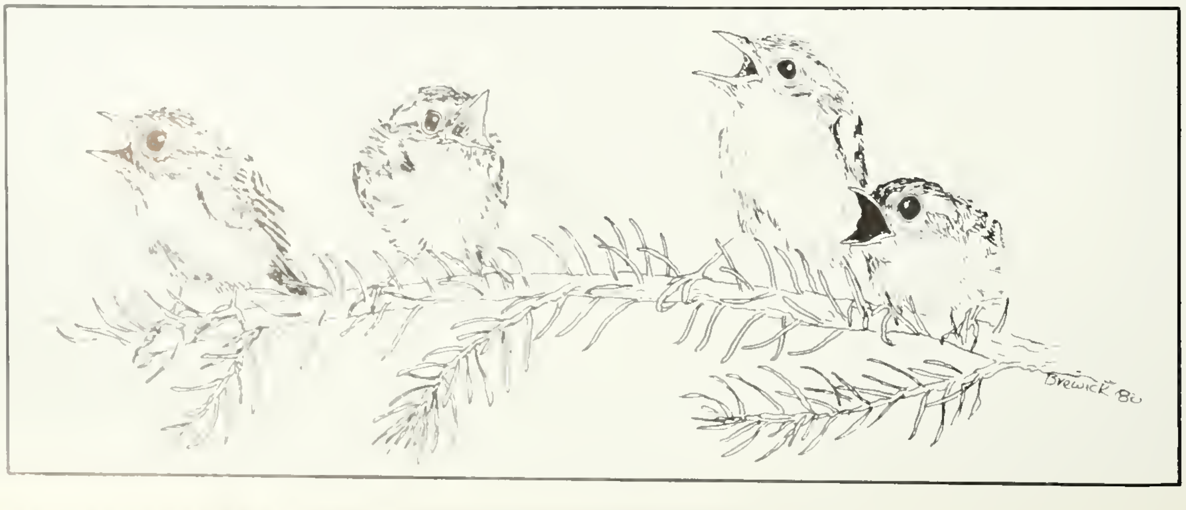
According to the National Wildlife Federation, the common housefly is apparently the most far ranging species outside of man. Originally confined to the tropics, the fly extended its range through adaptability to man's every way of life. It spends the cooler seasons in a dormant state and uses man's heated structures as its home. If man leaves the cooler regions, it is believed that the fly will again be confined to the tropics.

### Tecopa Pupfish Presumed Extinct

For the first time, an animal has been removed from the U.S. Endangered Species List for the reason that it is presumed to be extinct.

No one has seen a Tecopa pupfish since 1970. Its earlier haunts—small pools and springs near Tecopa, California — now contain no trace of the 1½-inch fish.

Its downfall began 20 to 30 years ago, according to the U.S. Fish and Wildlife Service, when two springs were rechanneled in connection with a bathhouse building project. The pupfish could not adapt to this change in its habitat. Also, various other fish brought into the area competed with the pupfish for food, and preyed on its young.



## California Lizard Added to Threatened List

The Coachella Valley fringe-toed lizard (*Uma inornata*) has been listed by the U.S. Fish and Wildlife Service as a threatened species, and its critical habitat delineated. In September 1978, the service proposed the lizard as "threatened with critical habitat," based on information from the California Department of Fish and Game, other state officials, and eight professional biologists. Later, to comply with subsequent amendments to the Endangered Species Act, the critical habitat portion of the proposal was withdrawn and reproposed after completion of an economic analysis and the addition of new biological information obtained subsequent to the original proposal.

The 4- to 5-inch lizard is found only in the Coachella Valley, Riverside County, California. Named both for its home and the tiny projections on its toes which enable it to run easily over the sand, this small reptile evades predators by "swimming" beneath the loose surface. The presence of wind-blown sand, therefore, is essential to the lizard's survival.

Agricultural and urban development have reduced the lizard's range from about 324 square miles historically to about 120 square miles today, of which 50–99 are considered suitable habitat. Permanent human residents in Coachella Valley, which numbered about 12,000 in 1942, currently exceed 100,000 and are projected to reach up to 164,000 by 1990. (Seasonal residents may add another 40 percent or more to the current total.) At present, however, none of the lizard's habitat has been permanently preserved, and zoning plans indicate that all of its remaining range could eventually be developed.

The habitat is further threatened by an invasion of Russian thistle, an introduced shrub that is spreading throughout the West, and by stands of tamarisk trees planted as windbreaks. Both plants are stabilizing sand deposits. Increasing use of off-road vehicles is yet another danger to the fragile desert ecosystem.

Under the threatened classification, it is illegal to take Coachella Valley fringe-toed lizards (except under permit for approved conservation purposes), and to sell them in interstate or foreign commerce. The lizard is also protected under California's endangered species legislation.

About 12,000 acres (18.5 square miles), which include both the areas of highest lizard concentration and a source of blow sand, have been designated critical habitat. Such a determination does not create a sanctuary or wilderness area, nor does it represent federal intent to control purely private land use; rather, it complements the protection already given a species at the time of its listing by requiring federal agencies to ensure that actions they fund, authorize, or carry out will not likely jeopardize the habitat of the protected species.

A critical habitat designation will not necessarily block flood and blow sand control, a major concern of Valley residents. Close consultation between project sponsoring agencies and the service often averts conflicts through mitigation or design modifications. The service will cooperate with other federal agencies to minimize any impacts on local residents, and to maintain the lizard as a viable part of the fauna of the Coachella Valley.

Although almost none of the critical habitat is currently under federal protection, the Bureau of Land Management is negotiating with several landowners in the area for possible land exchanges. One corporation is expected to exchange approximately 20,000 acres in Coachella Valley, including 5,000 acres of critical habitat. In addition, listing the lizard as a threatened species makes it possible for the service to negotiate for land acquisition with money from the Land and Water Conservation Fund as part of a multifaceted recovery plan to be prepared on behalf of the lizard. This property could then be preserved from future development, and managed instead for the lizard's needs.

## Two New Beetles on Threatened List

Two beetles occurring in California have been listed by the U.S. Fish and Wildlife Service as threatened species, with critical habitat determined for each. The delta green ground beetle *(Elaphrus viridis)* and the valley elderberry longhorn beetle *(Desmocerus californicus Dimorphus)* were each proposed for listing in the August 10, 1978, *Federal Register*.

The valley elderberry longhorn beetle originally occurred in elderberry *(Sambucus* sp.) thickets in moist valley oak woodland along the margins of the Sacramento and San Joaquin Rivers in the Central Valley of California. Currently, the beetle is known from less than 10 localities in Merced, Sacramento, and Yolo Counties. Agricultural conversion, levee construction, and stream channelization have taken their toll on the species' habitat. Also, in some state and county parks where populations of the beetle occur, the clearing of undergrowth (including elderberry) and planting of lawns has caused further habitat degradation.

Two areas in Sacramento County have been designated as critical habitat for the valley elderberry longhorn beetle.

The delta green ground beetle is known to occur only at two sites in Solano County, CA. Metallic green and golden in color, this beetle is a predaceous member of the family Carabidae. It is known to occur only near two vernal pools south of Dixon in Solano County. Agricultural practices in this area threaten the species' survival.

The delta green ground beetle was first collected in 1876 from an unknown locality in California and was not rediscovered until 1974. Vernal pools, which are filled by winter rains and dry out by late summer, were once widespread throughout California, but only a few remain. Many of the vernal pools have been lost to river channelization, dam construction, and agricultural conversion of natural habitats. Elimination of the two vernal pools by agricultural conversion or other causes may cause the beetle's extinction. At one of the pools, plowing and land leveling may have already adversely affected the beetle.

Based on suggestions by the California Department of Fish and Game and the State Water Resources Control Board, the service included in its final critical habitat designation a portion of Olcott Lake outside the proposed critical habitat boundaries and the elimination of two areas which appear to be unsuitable as habitat for the beetle.

## Bald Eagle Days 1981

"Bald Eagle Management" will be the theme of Eagle Valley Environmentalists' (EVE) annual conference, to be held February 20, 21, and 22, in Davenport, Iowa. EVE has been invited by the U.S. Army Corps of Engineers to hold Bald Eagle Days in the Quad Cities area, which is a major wintering area for bald eagles. From the Blackhawk Hotel, the conference center, participants should be able to see bald eagles feeding at Lock and Dam 15 on the Mississippi River.

Bald Eagle Days has become one of the most important wildlife meetings in North America, attended by bald eagle researchers from all over the U.S. and Canada. There will be two days of scientific meetings, presentations of papers, and panel discussions centering on how to manage the bald eagle and its habitat. Bald Eagle Days also will feature a keynote speaker and a panel discussion on the future of the Mississippi River, on Friday evening, February 20. The following night, the Bald Eagle banquet will climax the conference with a guest speaker.

On Sunday, February 22, bus tours will take participants to eagle wintering areas along the Mississippi River. Further information is available from the EVE office at Box 155, Apple River, IL 61001.

# Latin American Neighbors Day

Sunday, January 18
11:00 a.m. – 4:00 p.m.

*"The Musicians," by Caroline Van Evera*

A Special, Day-Long Tribute to our neighbors south of the border will be presented by Field Museum on Sunday, January 18, 1981. Join us for this day of music and dance, ethnographic film, and tours of the Museum's collections highlighting the history and art of Latin America.

A program of music and dance features "Alma de Mexico," a group of ten Mexican folkdancers performing in Stanley Field Hall from 12:30 to 1:00 p.m. Their colorful "grupo foklorico," Mexico's traditional form of folkdancing, will fascinate audiences of all ages. From 1:00 to 2:00 p.m., delight to the lively rhythms of mariachi music with "Mariachi Jalisco," a group of seven Mexican musicians.

Robert Feldman, visiting curator of South American archeology, presents an illustrated lecture on "The Empires of the Peruvian Desert" at 2:15 p.m. in Lecture Hall 1, Ground Floor 1,500 years before the Incas, great empires arose in the barren valleys of the Peruvian north coastal desert. Their armies conquered vast territories, and their sophisticated irrigation works made fertile oases, providing food and wealth to support the building of spectacular temples and palaces. Dr. Feldman focuses on the accomplishments of these prehistoric empires which in some ways surpassed those of the modern Western world.

Also scheduled are a selection of programs highlighting Field Museum's Latin American collections: explore the fascinating ancient cultures of Mexico, interpret life in ancient Peru and its ties with today's cultures through its pottery, look at the textiles of South American cultures and watch a demonstration of weaving on a Mexican loom. Throughout the day, films from Field Museum's film library will be shown. Films include "Discovering the Moche," "Lords of the Labyrinth," and "The Potato Planters."

All activities are free with Museum admission. Complete listing of events available on Sunday, January 18, at Museum entrances. Tickets are not necessary. For more information, call (312) 322-8854.

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# *January & February at Field Museum*

*(January 16 through February 15)*

### Continuing Exhibits

INDIANS OF MIDDLE AMERICA. Aztec stone sculptures are a highlight of this exhibit, which focuses on Middle American cultures from 1500 B.C. to the present. In addition to costumes, pottery, and farm implements, you'll see dioramas of an Aztec marketplace and of a Maya dedication ceremony, as well as a dugout canoe of the modern-day Cuna Indians of San Blas. Hall 8, main floor.

WEAVING DEMONSTRATIONS. Volunteers demonstrate weaving on a European-style countermarch loom, the type brought to the New World by the Spanish Conquistadors. On display during the demonstrations are samples of cloth woven out of the hair of various animals, such as yak, dog, and rabbit. Second floor, South Lounge. 10 a.m.–noon, every Monday, Wednesday, and Friday.

### New Programs

LATIN AMERICAN NEIGHBORS DAY. Enjoy the music and dance of Mexico through the lively rhythms played by "Mariachi Jalisco" and the beautiful "grupo foklorico"—Mexico's traditional form of folkdancing—demonstrated by "Alma de Mexico." Films and tours (in English and Spanish) will highlight the history and art of South America. Dr. Robert Feldman, visiting curator of South American Archeology, will give an illustrated lecture, "The Empires of the Peruvian Desert," at 2:15 p.m. in Lecture Hall 1. A complete schedule will be available at Museum entrances on the day of the event. All activities are free with Museum admission. Sunday, Jan. 18, 11 a.m.–4 p.m.

FOSSIL-RUBBING DEMONSTRATION. Three local artists will do a fossil rubbing of *Xiphactinus audax*, a relative of the modern tarpon, that inhabited the seas about 100 million years ago. Stephen Swanson, director of environmental services, Grove National Historic Landmark, Glenview Park District, and coordinator of the event, will provide commentary on the process and on the fossil itself. Anniversary Hall, main floor. Feb. 13, 14 and 15, 12–3 p.m.

WINTER FUN. Children ages 5 to 9 can take part in workshops on natural history topics on Saturday, January 17, 24, and 31. Most workshops are single sessions of either 60 or 90 minutes. For times and registration information, call or write Field Museum's Public Programs, Department of Education: 322-8854 (Mon.–Fri.).

"Egyptian Hieroglyphs." Children see a film on ancient Egypt and learn to write their names in picture script. Ages 7–9. Members $5, nonmembers $6. Jan. 17 or 31.

"Indian Games." Girls and boys learn Indian games, hear Native American stories and music, and make Indian playthings. Morning sessions for ages 5–6, afternoon workshops for ages 7–9. Members $5, nonmembers $6. Jan. 17, 24, or 31.

"Days of the Dinosaurs." Children tour Hall 38 and make dinosaurs out of clay or draw these prehistoric reptiles. Morning sessions for ages 5–6, afternoon workshops for ages 7–9. Members $4, nonmembers $5. Jan. 17 or 31.

"Animals in Their Winter Homes." Children learn how animals adapt and protect themselves in the winter. Ages 5–6. Members $3, nonmembers $4. Jan. 17 or 24.

*Continued on back cover*

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# *January & February at Field Museum*

*Continued from inside back cover*

"Nature Lab." Young people examine a variety of specimens under a microscope—human and mammal hair, leaves, insects, and more. Ages 8–9. Members $5, nonmembers $6. Jan. 24

"Our Feathered Friends." Children learn what birds they can see in the Chicago area during the winter and construct a birdfeeder to bring home. Ages 8–9. Members $5, nonmembers $6. Jan. 24.

"Animal Art." Children tour the mammal halls, learn animal behavior, and draw their favorite animals. Morning sessions for ages 5–6; afternoon workshops for ages 7–9. Members $4, nonmembers $5. Jan. 24.

Weekend Discovery Program. Each Saturday and Sunday between 11 a.m. and 3 p.m., you can participate in a variety of free tours, demonstrations, and films on natural history topics. Check the *Weekend Sheet* available at Museum entrances for locations and additional programs.

"Many Mexicos" explores the fascinating ancient cultures of Mexico from the Olmecs to the Aztecs. Saturday, Jan. 17, 1 p.m.

"Ancient Egypt" surveys the traditions of ancient Egypt, from everyday life to myths and mummies. Saturday, Jan. 24, 11:30 a.m.

"Indian Fishermen of the Northwest Coast" illustrates daily and ceremonial life centered on the fish harvest. Saturday, Jan. 24, 1:30 p.m.

"Indian Life on the Prairies" concentrates on nomadic life when the Indians hunted the buffalo for survival. Sunday, Jan. 25, 1 p.m.

"Stories of Field Musuem" gives the fascinating background of some of the best-known exhibits, including Bushman, Su-Lin the panda, and the Tsavo man-eating lions. Saturday, Jan. 31, 1 p.m.

"Life in Ancient Egypt" focuses on the objects and practices (including mummification) of ancient life in the Nile Valley. Sunday, Feb. 1, 1 p.m.

"Native American Foods and Cooking" acquaints visitors with the diet of Native Americans and their methods of cooking, hunting, farming, and fishing. Saturday, Feb. 7, 11 a.m.

"Africa Calls: Its Drums and Musical Instruments" is a film documenting how African music serves as an accompaniment to work and worship. Saturday, Feb. 7, 1 p.m.

"History of Egyptian Pyramid Construction" is a 45-minute slide presentation on pyramid-building, beginning with the magnificent ruins at Saqqara, built for Zoser. Sunday, Feb. 8, 1 p.m.

"Atumpan: The Talking Drums of Ghana" is a film which discusses the major role of ceremonial drums in the ritualistic installation of a chief, and "African Religions and Ritual Dances" presents a reenactment of a Yoruba cult dance. Saturday, Feb. 14, 1 p.m.

"Clay Dinosaurs." After looking at dinosaurs, children will make their own of clay to take home. Sunday, Feb. 15, 11 a.m.–1 p.m.

## Continuing Programs

Volunteer Opportunities. Individuals with scientific interests and backgrounds are needed to work in various Museum departments. Contact the Volunteer Coordinator, 922-9410, ext. 360.

January and February Hours. The Museum is open from 9 a.m.–4 p.m., Monday–Thursday; 9 a.m.–9 p.m., Friday; and 9 a.m.–5 p.m., Saturday and Sunday.

The Museum Library is open weekdays from 9 a.m. to 4 p.m. Obtain a pass at the reception desk, main floor.

Museum Telephone: (312) 922-9410

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# FIELD MUSEUM OF NATURAL HISTORY BULLETIN

February 1981

NATURAL HISTORY SURVEY

# Field Museum
# of Natural History
# Bulletin

February 1981
Vol. 52, No. 2

*Editor Designer:* David M. Walsten
*Production:* Martha Poulter
*Calendar:* Mary Cassai
*Staff Photographer:* Ron Testa

## Field Museum of Natural History

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*Ordovician Habitat Group in Hall 37 (the Hall of Invertebrate Paleontology). The scene depicted is a good example of the crowded sea floor of some 450,000,000 years ago. In six square feet of ocean bottom are fifteen species of animals, not to mention a seaweed. Some of these are colonial corals and bryozoans that band together and build single structures for the housing of thousands of individuals. Photo by Ron Testa.*

*Cameroon trumpeter, 1971*

Phil Clark

# A Celebration of African Music

*Saturday, Feb. 28, 2:00 p.m.*
*James Simpson Theatre*

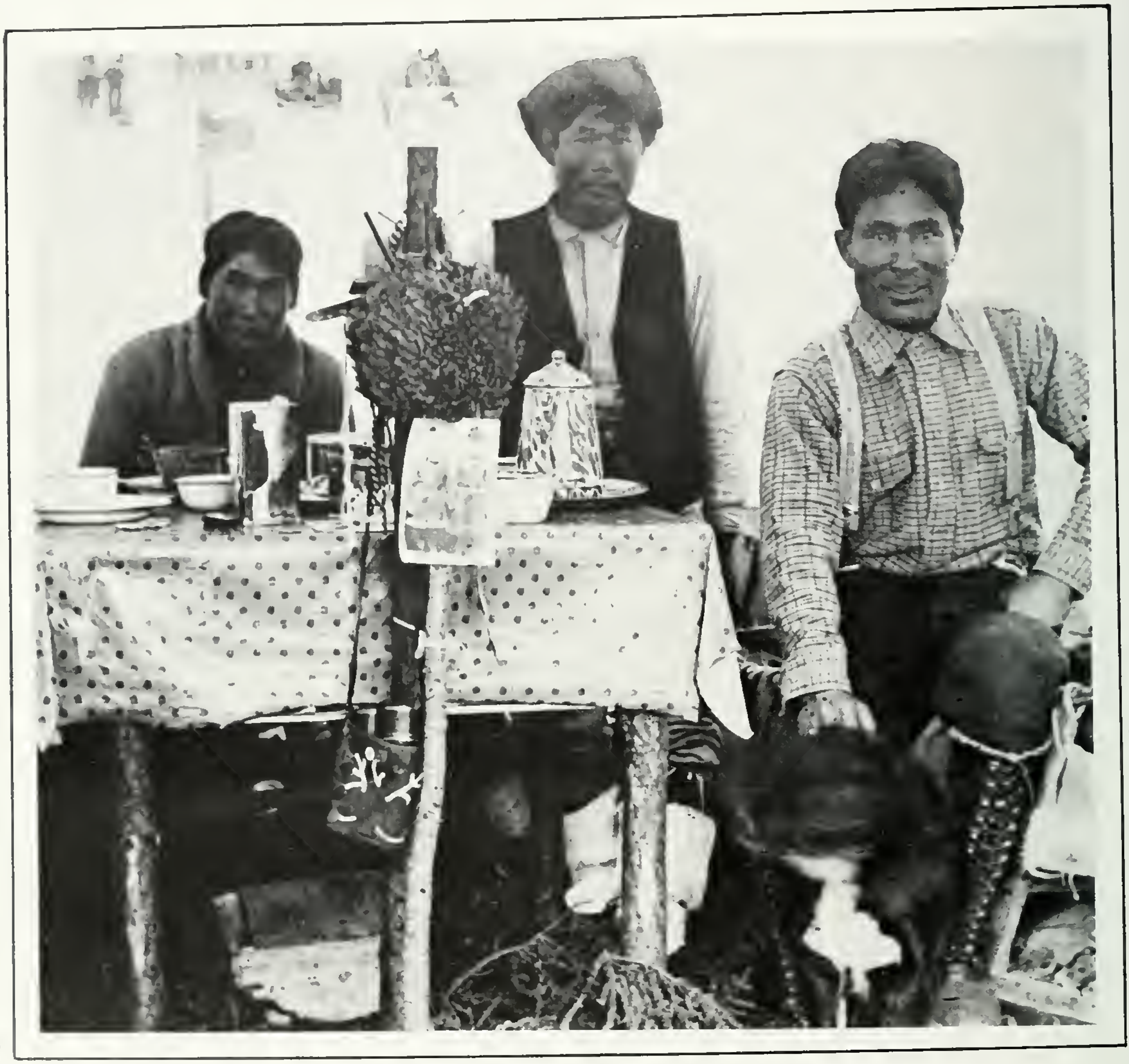
COME TO FIELD MUSEUM and join us in a celebration of West African musical heritage as it lives in American jazz today. AFRO-BLUE features important Chicago musicians in concert. Artists include "The Mandingo Griot Society," who evoke the troubadour heritage of Africa's Mandingo regions, and "Kudu," who perform original compositions based on the African experience. Documentary films are shown to trace the African influence on jazz in the early part of the twentieth century.

PRESENTED IN CONJUNCTION with the Winter Learning Museum Course, "West African Art: Power and Spirit," AFRO-BLUE depicts a musical tradition so strong that it survived the savage journey to the new world and slavery. Dr. Paul Berliner, a Northwestern University ethnomusicologist and award-winning author of *Soul of Mbira*, and his group Kudu play music based on African musical structure and lyrics using drums, bass, and saxophones. Other performing artists complete the spectrum of music offered—from richly melodic African rhythms to contemporary American jazz.

JOIN HOST NEIL TESSER, Chicago *Sun-Times* jazz critic, and a variety of talented performers for an exhilarating musical experience. AFRO-BLUE is made possible by a grant from the National Endowment for the Humanities, a federal agency.

TICKETS to AFRO-BLUE are $3.00 for Museum members, $5.00 for nonmembers, and can be purchased at the door on the day of the event. For more information, call 322-8854 Monday through Friday.

# Through a Missionary's Eyes:



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Courtesy University of Alaska Archives Charles Bunnell Collection

# Photo-Documentation of Ingalik Indian Life, 1893–1925

By JAMES W. VANSTONE

*curator of North American archeology and ethnology*

IN 1887 the Rev. John Wight Chapman (1860–1939) established an Episcopal mission among the Athapaskan-speaking Ingalik Indians in the village of Anvik on the lower-middle Yukon River, Alaska. He was to serve his church at Anvik for more than forty years and had lived among the Ingalik for three years when he first [illegible] camera and became enthusiastic about photography. He was thus well known to the Indians and had established good rapport in the community by the time he took his first pictures.

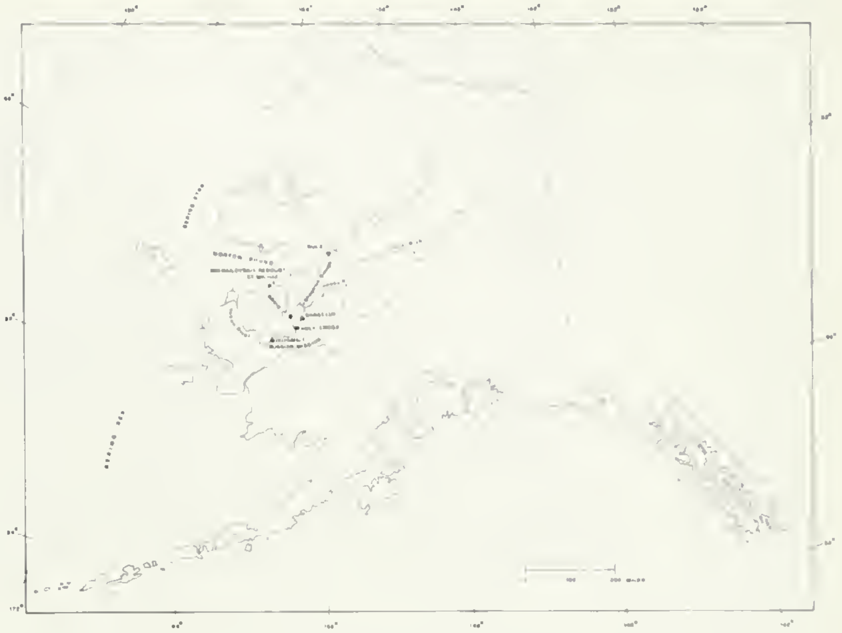
The photographic record which he made over a period of thirty-five years reflects his interest in many aspects of Ingalik Indian life, as well as the interest and cooperation of those whom he photographed. The photos reproduced here are of special interest to us for the way in which they reveal changes in Ingalik culture during the late nineteenth and early twentieth centuries.

The period of sustained European contact on the lower Yukon began with the establishment of Mikhailovskiy Redoubt (St. Michael), northeast of the river's mouth, by the Russian-American Company in 1833 and with the penetration of the Yukon Valley by Andrey Glazunov's expedition the following year. Additional posts were established at Ikogmiut in 1836 and at Nulato on the middle Yukon in 1838. At first the fur harvest was abundant, and meaningful economic relations were established with the Ingalik and their neighbors. Soon, however, the quantity of furs began to diminish, primarily because the Russians were not sufficiently acquainted with the country, the traditional economic patterns of its native inhabitants, and the kinds of effort necessary to develop new patterns that would benefit themselves.

In spite of the presence of a number of trading posts in west-central Alaska, the native inhabitants continued to depend on their Eskimo neighbors to the north, the latter maintaining direct contact with the Chukchi who had access to supplies available from Siberian trading posts on the Kolyma River. For more than thirty years the Russian-American Company struggled to turn the fur trade to its own advantage, but was unsuccessful by the time Alaska was sold to the United States in 1867.

During the early American period the Ingalik benefited from competition between the Alaska Commercial Company—successor to the Russian-American Company—and the Western Fur and Trading Company; but following the collapse of the latter in 1883 the situation changed radically. Prices paid for furs were forced down and the Indians' greater dependence on European goods, together with a decline in numbers of fur-bearing animals and some large game animals, gave traders a new power and authority.

The introduction of commercial fur trapping necessitated a reorientation of Ingalik ecological and social patterns. The traditional seasonal ecology of the Indians had involved periods of both dispersal and aggregation and the fur trade accentuated the degree and duration of social isolation in every season of the year except summer. Most furbearers had been of little significance to aboriginal subsistence, and the effective deployment of trappers to harvest thinly distributed furs was different from traditional arrangements for taking caribou, moose, small game, and fish.



Courtesy the Archives of the Episcopal Church

*2. The Rev. John Wight Chapman in 1916.*

Beginning in 1845 with the establishment of a Russian Orthodox mission at Ikogmiut, traditional Ingalik religion was confronted by a small but dedicated group of church workers who became increasingly significant as agents of culture change. The first Orthodox priests were able to make only infrequent visits to most of the widely dispersed villages and this restricted their influence. Isolated, by the departure of the Russian-American Company in 1867, they were poorly equipped to withstand the determined intrusion of Episcopalian and Roman Catholic missionaries twenty years later. Both denominations sent workers into the area in 1887, with the Roman Catholics establishing their mission at Holy Cross, opposite the mouth of the Innoko River.

Although the missions emphasized programs aimed at changing the religious views of the people, their efforts affected virtually every other aspect of Indian life as well. Educational programs opened up a new world to village young people and helped them to learn English, a valuable asset as face-to-face contacts with Euro-Americans increased. In the early years of the missions the authority of the missionaries was virtually complete, since they controlled education, medical services, and other areas of access to the outside world. After the turn of the century, as the United States government assumed greater responsibility for services in the communities, the missionaries gradually became less significant as an acculturative force.

An influx of miners into the Yukon Valley began with the Klondike gold rush in 1897 and continued until the decline of diggings on the upper Innoko River just prior to 1920. As a result, new and abundant opportunities for interaction with outsiders were presented to the Ingalik. Indians worked on the river boats that brought miners and supplies to the gold diggings and they also found employment as wood choppers supplying fuel to these vessels. Although the volume of river traffic declined sharply following the collapse of the Innoko diggings, the Ingalik were never again as remote from the outside world as before the discovery of gold on the Yukon and its tributaries.

It is clear, therefore, that when the Rev. John Chapman arrived in Anvik, the Ingalik were on the threshold of an era of rapid culture change. As an agent of some of this change, he was responsible for much that was new in Ingalik life. As a photographer, he documented both the old and the new.

The largest assemblage of Chapman photos are currently deposited in the National Anthropological Archives, Smithsonian Institution, but some are also located in the Archives and Manuscript Collections, University of Alaska, Fairbanks, and the Archives and Historical Collections, the Episcopal Church, in Austin, Texas. Prints from the Smithsonian and the University of Alaska are reproduced here and these can be divided into two major groupings according to content. In the first group (*Figs. 1–7*) methods of subsistence are shown, including food-getting activities that are no longer

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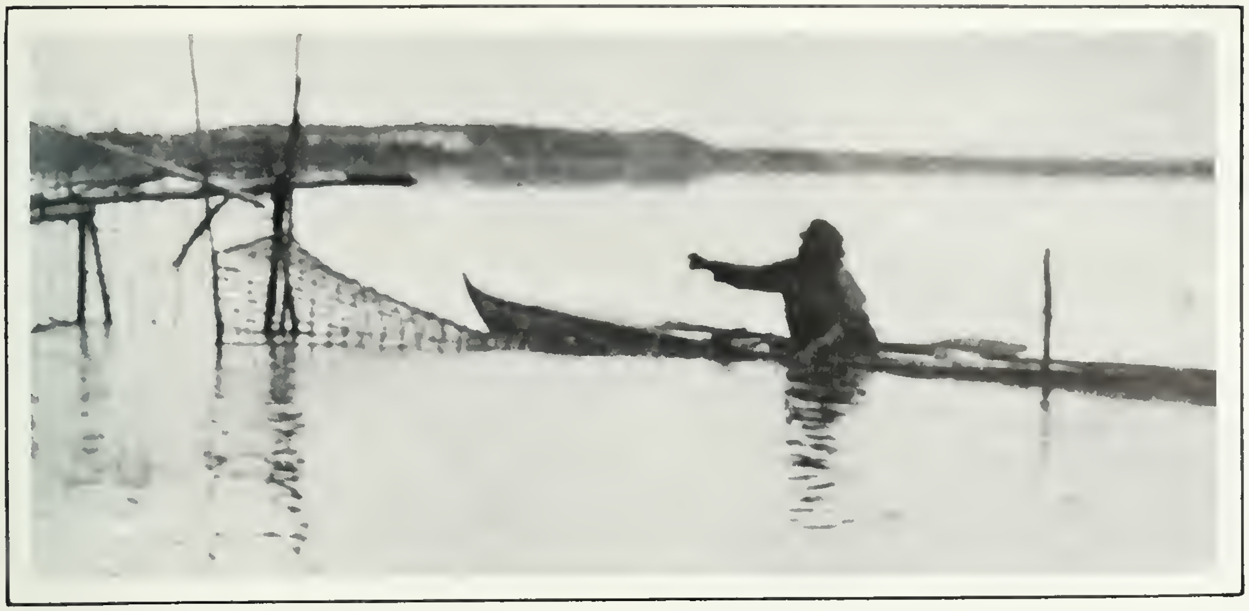
Courtesy Smithsonian Institution, National Anthropological Archives



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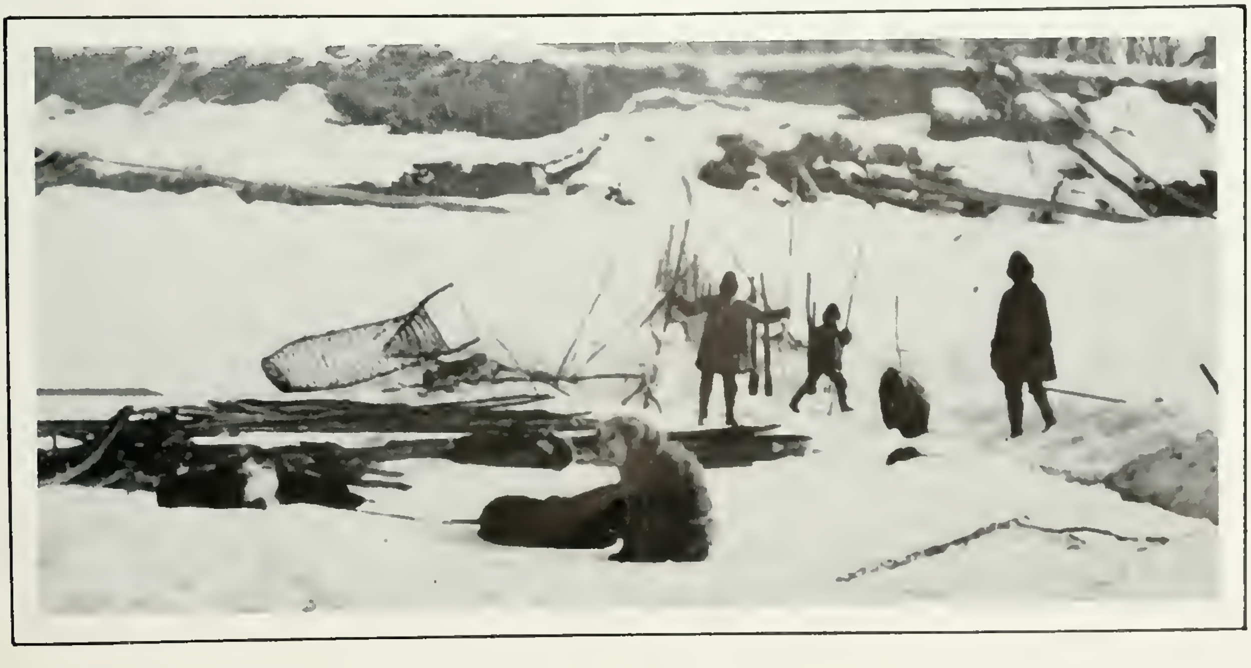
Courtesy Smithsonian Institution, National Anthropological Archives

practiced. Also depicted are early wage labor opportunities available to the Ingalik.

*Figure 1.* Interior of a reindeer herder's tent near Shageluk, 1918. The lower-middle Yukon region participated marginally in the government-sponsored reindeer herding program; this was begun on the coast in 1892 in hopes of putting the Eskimo economy on a more solid footing. A government herd relocated at the Ingalik village of Shageluk on the Innoko River in the winter of 1917–18, was the first successful introduction of the reindeer industry among the Indians of the interior. The herder's camp where this tent was located was a few miles east of Shageluk in an area of good forage; from there the herders watched the herd, attempting to keep the animals together. The reindeer program among the Ingalik eventually failed and the reasons were multiple, perhaps due as much to biological and environmental causes as to any active resistance on the part of the Indians. Like the neighboring Eskimos, however, the Ingalik were accustomed to a relatively stable village life and found it difficult to adapt to the nomadic routines associated with close herding.

*Figure 3.* Dip net fishing for silver salmon below Anvik in 1916. King salmon were also formerly taken in this manner. The fisherman, in his river canoe as shown here, drifted downriver with the current while holding a long-handled net in the water. When an ascending salmon was caught, it was lifted out, killed and placed in the canoe; then the operation was repeated.

*Figure 4.* Checking a fish trap at the mouth of the Anvik River in 1893. In the late nineteenth century, all varieties of salmon were taken most commonly in large basket traps, although gill



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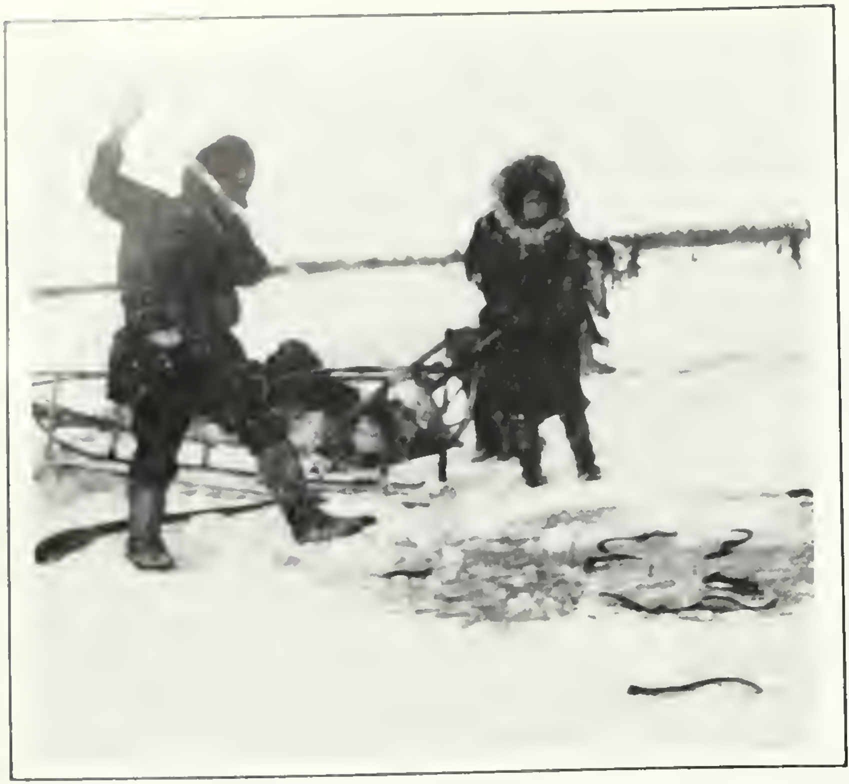
Courtesy Smithsonian Institution, National Anthropological Archives



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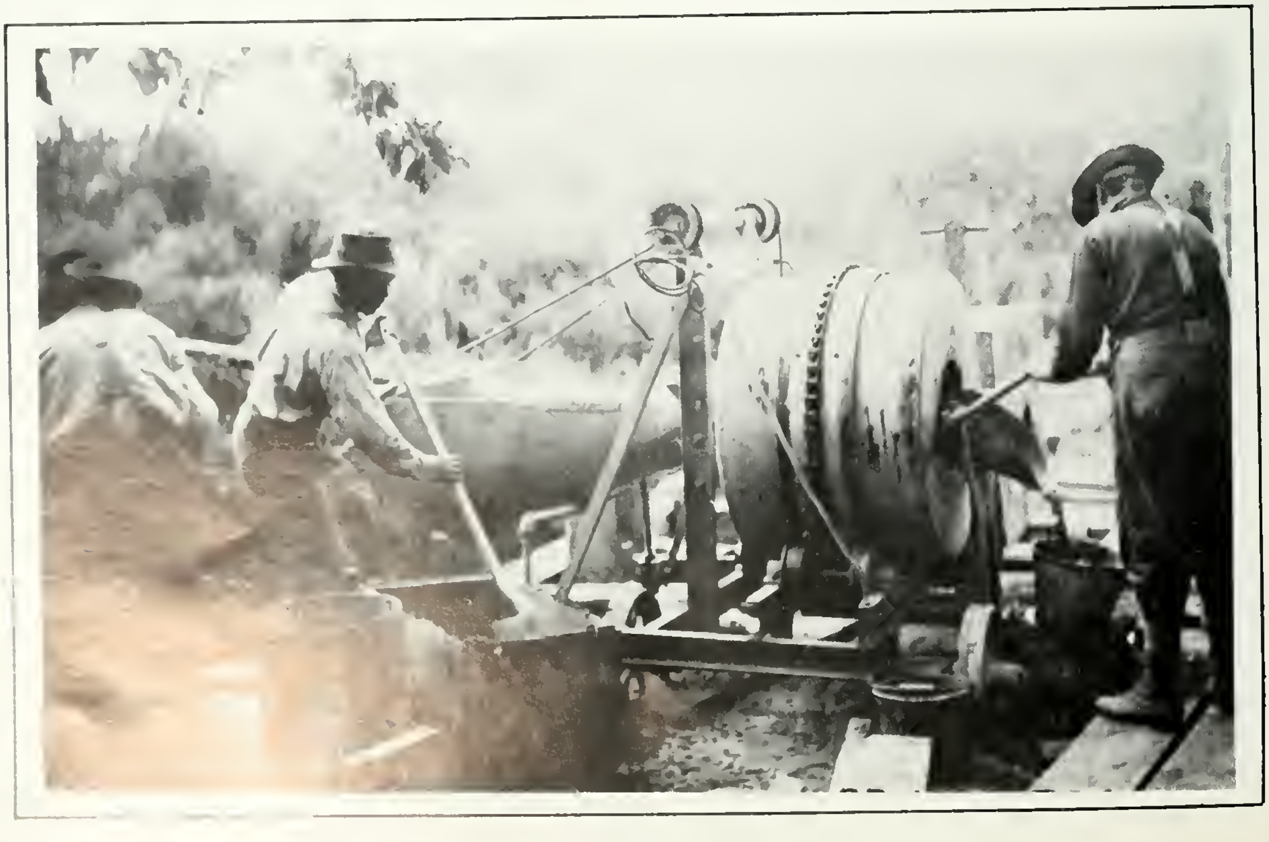
Courtesy Smithsonian Institution National Anthropological Archives

nets were also used.[1] For king salmon, traps were more effective than nets, since these fish do not travel as close to shore as other species. The traps were set at the outer end of long fences of stakes that extended from shore. Fish wheels — wire mesh dippers mounted on an axle and turned by the current—were in general use by the Ingalik in 1913 or 1914, but did not replace traps immediately. Residents of Anvik today recall that wicker traps were still in use during summers into the early 1920s.[2]

*Figure 5.* Fishing with traps through the Yukon River ice; undated but probably about 1898. Fishing continued throughout the winter, with traps being set in favorable locations along the Yukon and Innoko rivers as well as in smaller streams for ling, whitefish, and pike. Occasionally such traps were located where the ice was as much as five feet thick; to chop a hole large enough for the trap could be difficult work. These traps, usually taken up once or twice a week, might contain from 20 to 200 pounds of fish; the usual weekly harvest appears to have been about 50 pounds.[3]

*Figure 6.* Spearing lampreys through the Yukon River ice; undated but probably about 1898. Toward the end of November the annual run of lampreys occurs on the Yukon River, and the Ingalik had a series of holes ready for instant use, keeping a sharp lookout for them. As soon as the lampreys were seen in the hole furthest downriver, the fishermen began scooping these fish out with small nets or hooking them with a barb fastened to a long pole, as shown here. When the lampreys had passed one hole, the fishermen would move to the next. The run lasted only a couple of days, but because the fish moved slowly in a compact mass close to the surface, many hundreds of pounds were taken if the run was good. They were eaten frozen and raw, their oil being used in lamps and for cooking.[4]

*Figure 7.* Operating a cement mixer for the Episcopal mission at Anvik in 1917. The earliest wage



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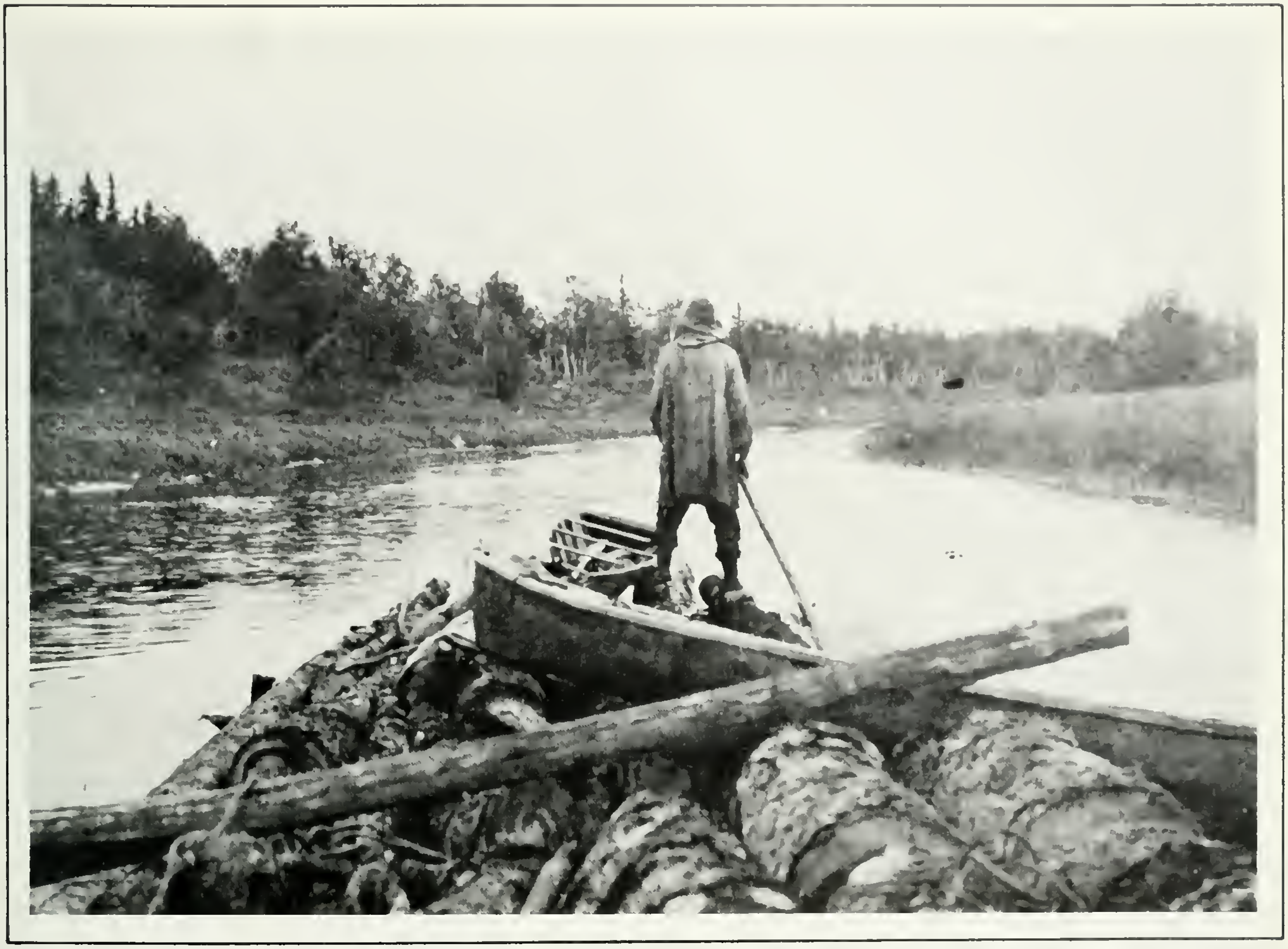

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Courtesy University of Alaska Archives, Charles Bunnell Collection

employment opportunities on the lower-middle Yukon were provided by the missions. At Anvik, as the mission complex expanded, there was a need as well as a desire to hire Indians to assist in the work. During its early years, the mission paid for labor in goods such as flour, tea, and dry goods, but this form of payment frequently led to dissatisfaction on the part of the Indians, so the Episcopalians soon shifted to a money wage. The concept of working for cash wages rather than wages in kind was introduced on a small scale as early as the 1880s and became an established pattern when prospectors began to arrive in the Yukon Valley after 1897.[5]

*Figure 8.* Rafting wood for steamboat fuel on the Innoko River in 1919. Until about 1903, all Yukon and Innoko River steamboats stoked their furnaces with wood. The larger boats consumed from one to two cords of wood an hour depending, of course, on the swiftness of the current and whether they were going up or downstream. Much of the wood was cut by Indians, and this proved to be the most reliable form of

Reproduced from *The Alaskan Missions of the Episcopal Church* by Hudson Stuck (1920)

*9. The Rev. John Wight Chapman*

income for the Ingalik during the gold rush period. They worked independently at first, and later as employees of established wood yards located at intervals along the Yukon. With the decline in gold mining, river traffic dropped off sharply, but some vessels continued to burn wood until the beginning of World War II.[6]

The second group of photos throws light on changing community and settlement patterns both at Anvik and in Yukon River fish camps. Photographs of the latter were an important aid to a settlement pattern survey of the lower-middle Yukon region[7] and are useful for the study of shifts in the settlement pattern with reference to resource utilization.

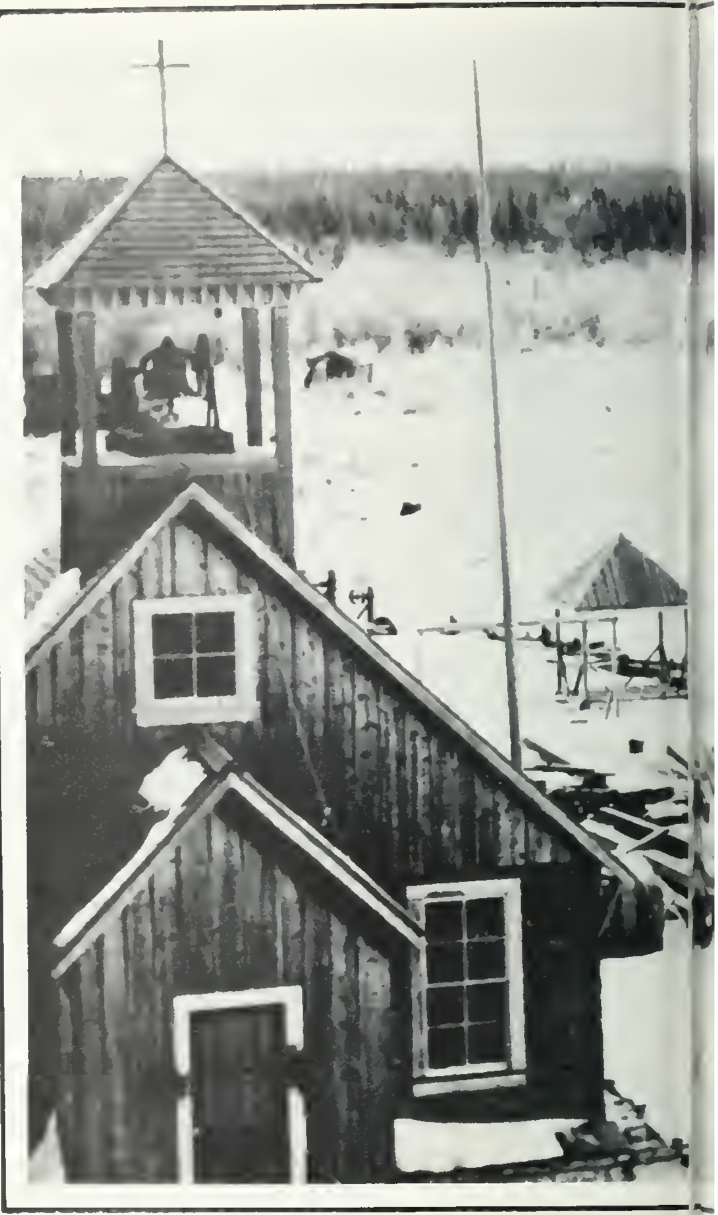
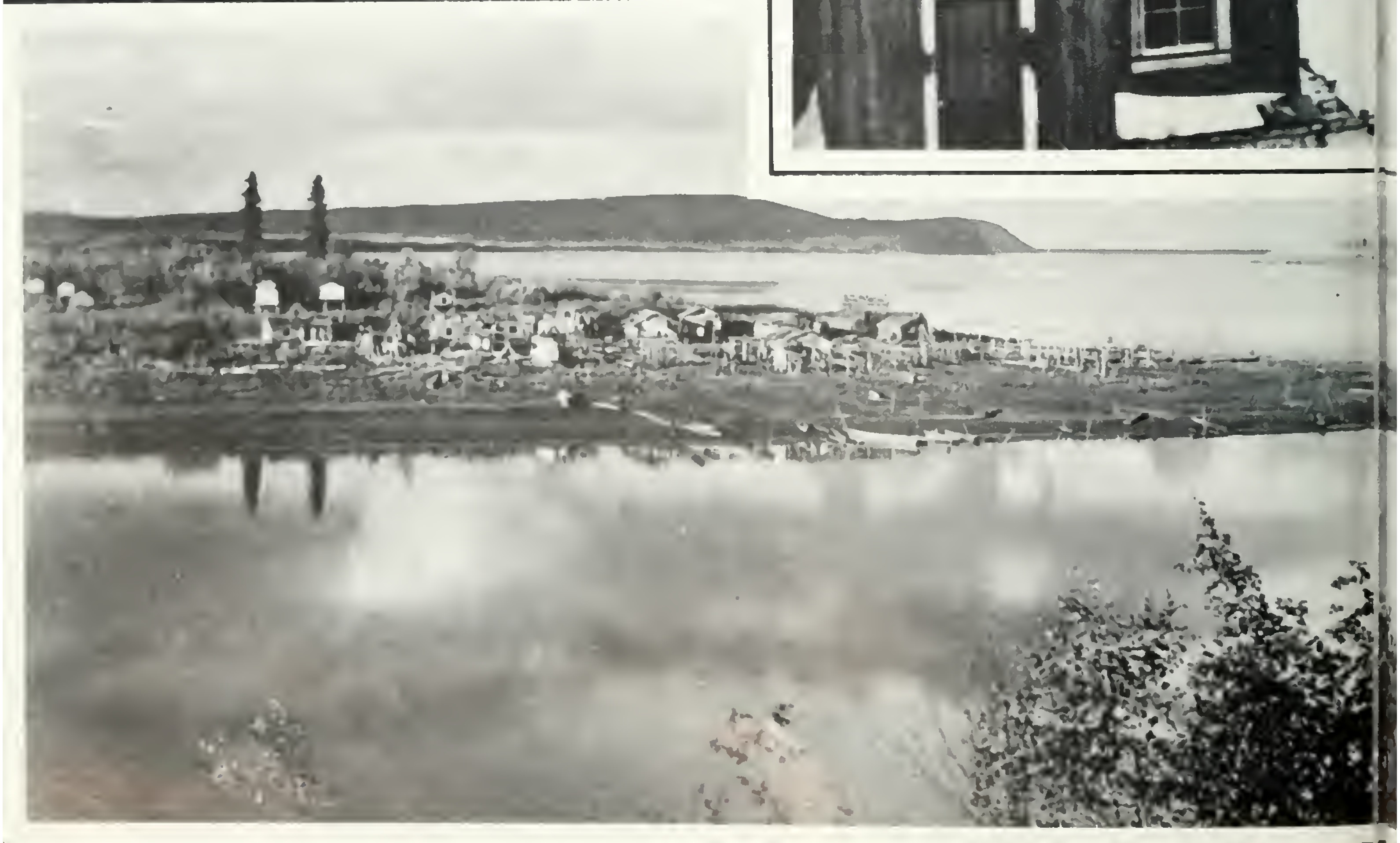
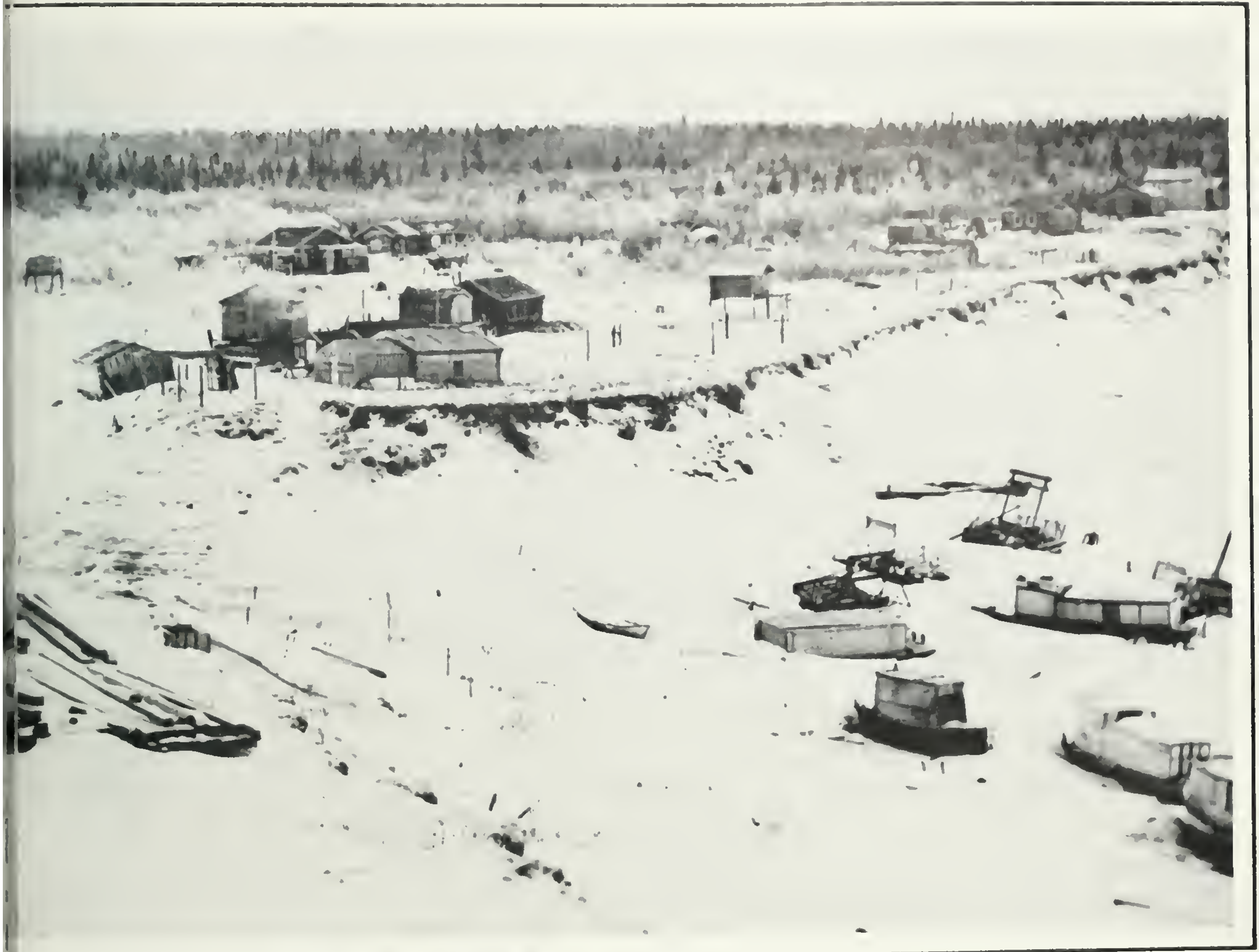


*Figure 10.* Anvik Point about 1920. This was the original settlement at the mouth of the Anvik River, located on the left bank, and was the one visited by Russian explorers early in the nineteenth century. Although the river bank has been cutting away in this area for many years, in the past it was an excellent location for building houses and for fishing. The settlement was also strategically located for meeting travelers along the Yukon River and those on their way from Norton Sound to the Innoko River country by way of the Anvik River.[8] At the time

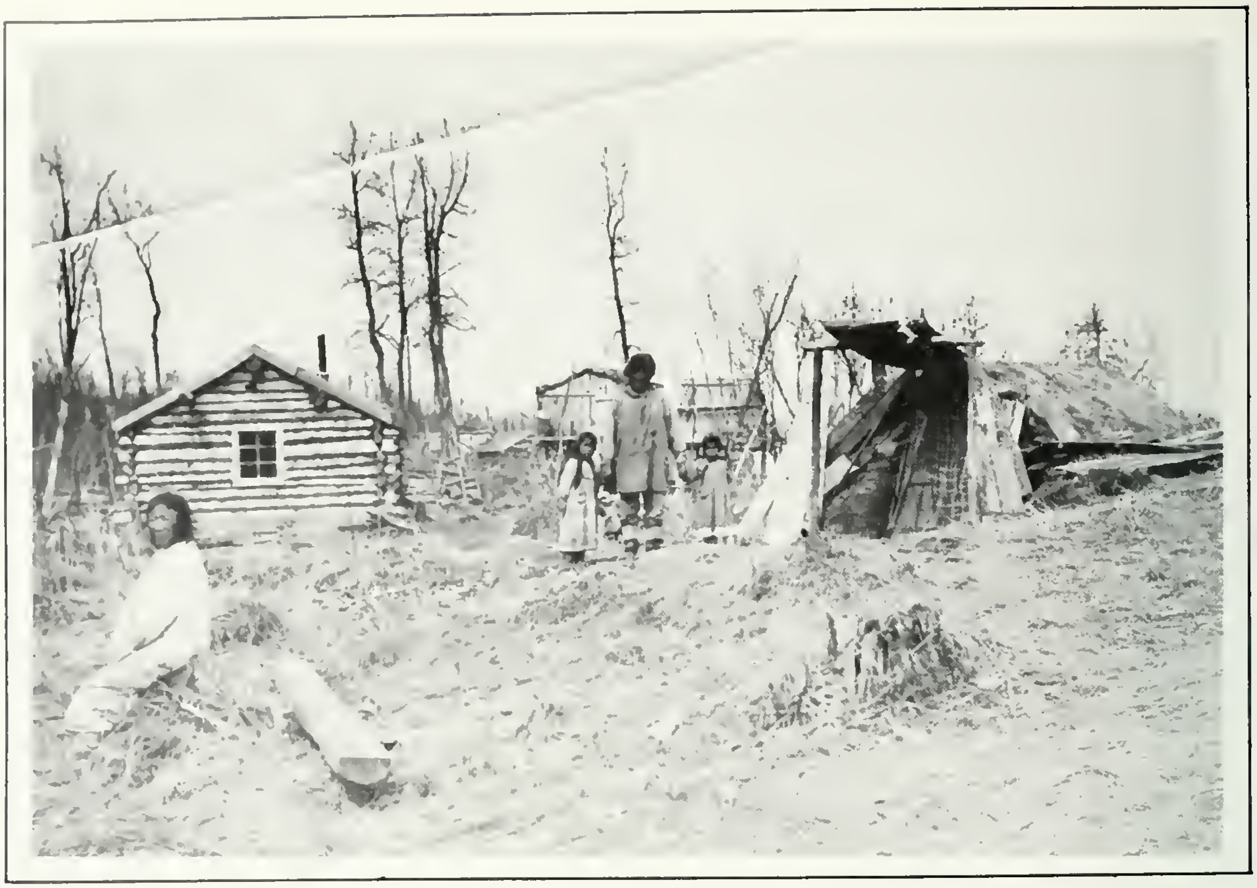




Courtesy University of Alaska Archives Charles Bunnell Collec

this picture was taken, Anvik Point was used primarily as a fish camp. Today it is completely abandoned.

*Figure 11.* Anvik village on January 1, 1919. The present Anvik village is located on the right bank just inside the old mouth of the Anvik River. In 1934 the Anvik cut through the narrow tongue of land separating it from the Yukon, the lower two miles of the Anvik becoming a slough. A small creek enters the Anvik on the right bank just above its old mouth and it was at this point, directly across the river from Anvik Point, that the Episcopal mission constructed its buildings in 1889, having moved from a site two and a half miles further up the river. Gradually, as they accepted Christianity, the inhabitants moved across the river onto church land. In the background of this photo are the houses of Indians who had made this move. In the foreground is the oldest Episcopal church in Alaska, constructed in 1893 and still standing.

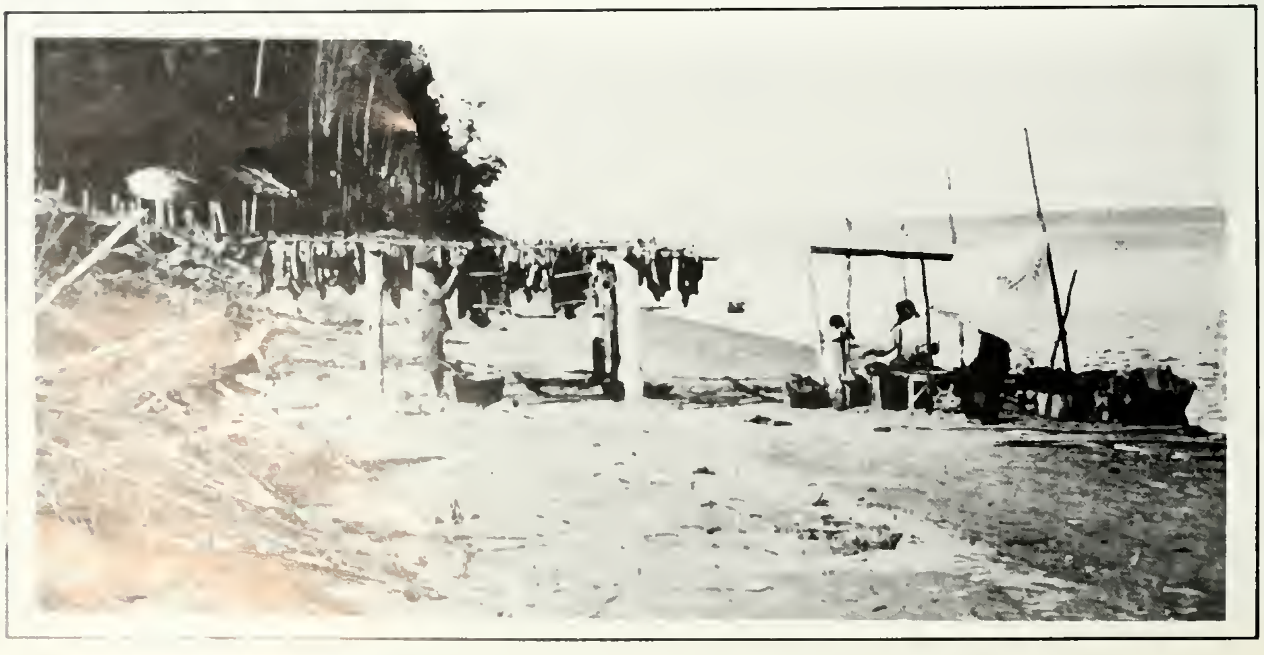


12

Courtesy Smithsonian Institution National Anthropological Archives

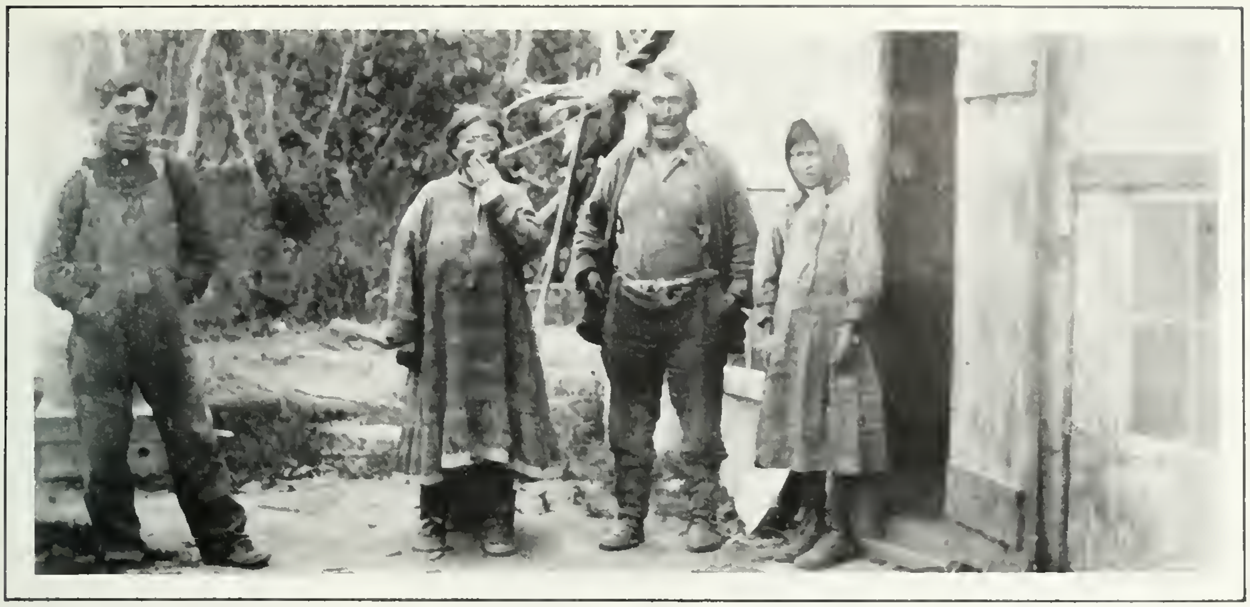
*Figure 12*. Houses at Anvik about 1923. As late as 1892, all the inhabitants of Anvik lived in traditional semisubterranean winter houses of the type described in considerable detail by Osgood.[9] Within three years, however, nearly one-third of the villagers occupied log structures. Although the mission had much to do with encouraging the Indians to abandon their traditional houses, examples set by miners and other whites in the area provided an additional impetus, so that not long after 1900 traditional houses had virtually disappeared. There were only two remaining at Anvik Point in that year.[10] Chapman took this photo because he believed it to show the old and the new. The house at the right is in a modified-traditional style; that on the left is a log cabin which was typical of the village then and remains typical today.

*Figure 13*. Four Mile Fish Camp in 1919. This site, now abandoned, may have been one of the older camps along this stretch of the Yukon River. Elderly informants at Anvik confirm an occupation in the late nineteenth century and further note that the site has been used regu-



13

Courtesy Smithsonian Institution, National Anthropological Archives



14

Courtesy Smithsonian Institution, National Anthropological Archives

larly during the summer, and sometimes in winter, until recent years, when the virtual replacement of dog transportation by mechanized snow vehicles reduced the necessity for catching and drying large numbers of salmon. Such camps were invariably located where small creeks enter the river. Most are now abandoned and few are shown on historical maps and charts of this section of the Yukon, although a number would appear to have been occupied seasonally at least as early as the mid-1800s.

*Figure 14* illustrates an aspect of culture change more specifically related to the presence of the Episcopal mission at Anvik. A famous Ingalik shaman, Nikolai Doctor, poses with his wife and friends. To fully appreciate this photo it is necessary to know that Chapman sometimes saw his problems at Anvik almost completely in terms of obstacles imposed by shamans, and he perceived himself as constantly in a virtual state of war with these traditional religious practitioners. Although this photo is undated, it was almost certainly taken after 1919, in which year Nikolai Doctor renounced shamanism and accepted Christianity, an event which caused great rejoicing at the mission.

Unlike many nineteenth-century missionaries in Alaska and elsewhere, John Chapman had a genuine interest in Indian language and culture, a fact indicated by his long-term commitment to learning Ingalik, an Athapaskan language, his translation of parts of the *Book of Common Prayer* into that language, and his many articles in church publications and anthropological journals. Some of his other photos, obviously intended for use at public presentations to church audiences, focus on themes related to the achievement of mission goals. By far the greater number, however, were simply intended to document those aspects of Ingalik culture which seemed noteworthy and were in danger of disappearing unrecorded by a sympathetic observer. With the cooperation of his Indian informants he produced an important ethnohistorical resource which, when used in conjunction with ethnographic data and historic source materials, adds a significant dimension to our understanding of the process of Ingalik culture change. ☐

## Notes

1. Osgood, 1940, pp. 226-27.
2. Chapman, 1913, pp. 49-50; VanStone, 1969b, p. 183.
3. Chapman, 1904, pp. 262-63.
4. Chapman, 1904, pp. 262-63; Osgood, 1958, p. 401; VanStone, 1978, p. 37.
5. VanStone, 1979b, pp. 124, 151
6. VanStone, 1979b, pp. 175-76, 178, 180, 192.
7. VanStone, 1979a.
8. Osgood, 1958, p. 28.
9. Osgood, 1940, pp. 302-12.
10. VanStone, 1979b, pp. 149, 186-87.

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1979b Ingalik contact ecology: an ethnohistory of the lower-middle Yukon, 1790-1935. *Fieldiana: Anthropology*, vol. 71.

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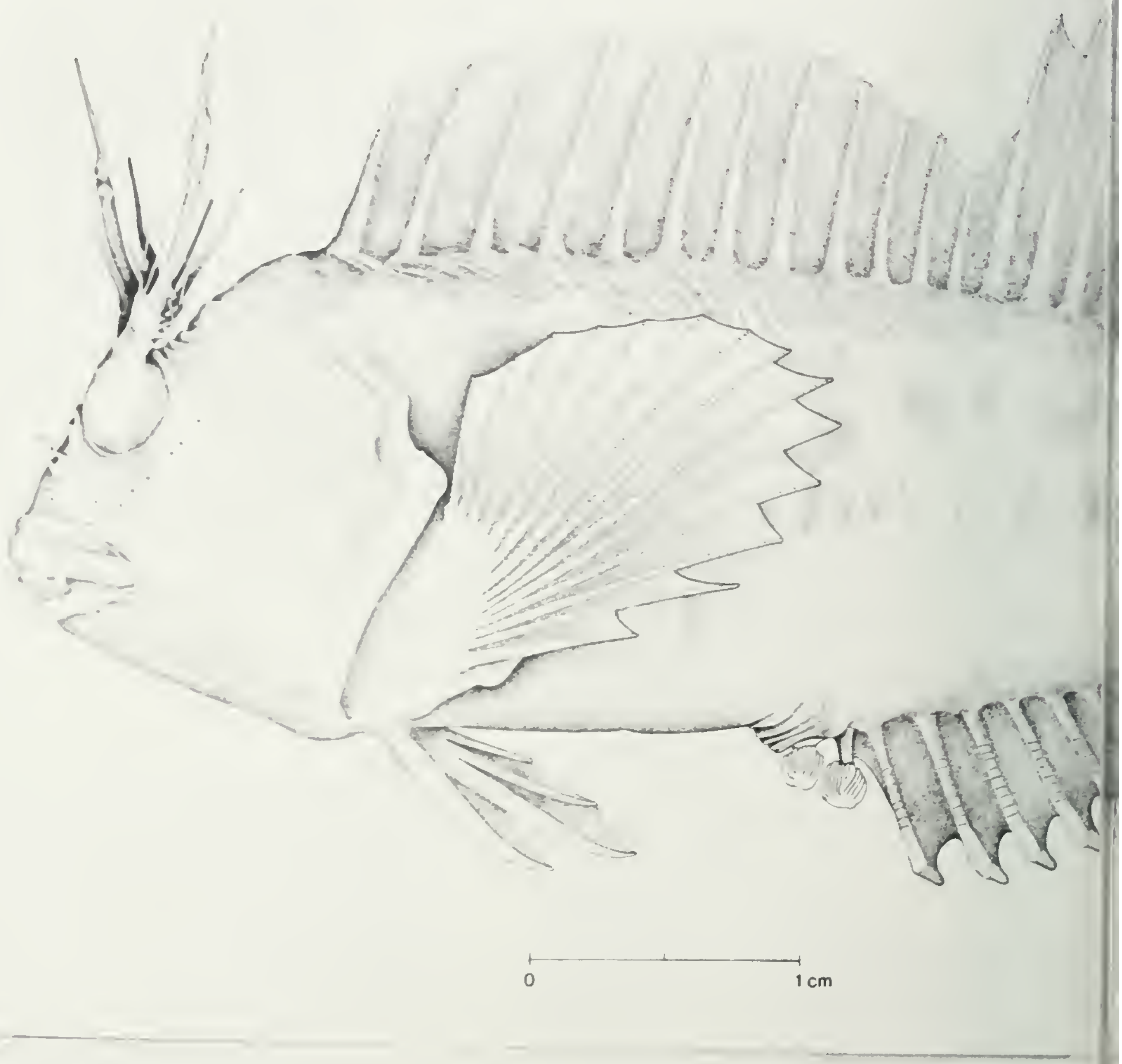


*Senior Sci[illegible] the Museum staff since 196[illegible] blenny, whose technical name ([illegible]us) is very nearly as long as the fish in rea[illegible]*

Dave Walsten

# FIELD BRIEFS

### Continental Bank Commemorative Plate Features Field Museum

In photo at right, Field Museum's Stanley Field Hall is the subject of the watercolor painting held by artist Franklin McMahon, center. The painting has been reproduced, in color, on an eight-inch china plate, held here by Field Museum President E. Leland Webber, right, as one of a series in the "Chicago Collection," commemorative plates issued by Continental Bank and recently made available exclusively to new or current depositors of a specified minimum amount. Field Museum Trustee George R. Baker, left, Continental executive vice president, holds another plate in the "Chicago Collection" series.

### NSF, NEA Grants

The National Science Foundation, a federal agency, has recently awarded two grants to the Field Museum in the total amount of $64,901. A grant of $9,356 is in support of systematics symposia held in the spring of each year at Field Museum; the Museum's first Spring Systematics Symposium was held in 1978. The new grant is for the 1981 and 1982 symposia.

An NSF grant of $55,545 for continued support of the project "Care and Use of Systematic Collections of Mammals" has been awarded the Division of Mammals.

The National Endowment for the Arts, a federal agency, has granted the Museum $20,000 to support the establishment of a student teacher training internship program. The new program is under the direction of Philip C. Hanson, head of Group Programs, Department of Education.

Dave Walsten

*Jarmila Kukalova-Peck, research associate of Carleton University, Ottawa, Canada, and an authority on Paleozoic insects, spent a month at Field Museum recently to study the Museum's collection of fossil insects from the world-renowned Carboniferous beds of Mazon Creek, Illinois. Dr. Kukalova-Peck is collaborating with Eugene S. Richardson, Field Museum curator of fossil invertebrates, in the preparation of papers concerning the Mazon Creek fauna. She visited the Museum under provisions of the Department of Geology's Visiting Scientist Program. Prior to her association with Carleton University, Kukalova-Peck served on the faculty of Charles University, Prague, Czechoslovakia.*

**Santa Claus** *paid an early visit to Field Museum, on December 11, to be with hundreds of young Museum members and their families. The occasion was the Museum's "Christmas Afternoon" party, sponsored by the Women's Board. Here Santa (Field Museum Photographer Ron Testa) exchanges season's greetings with two friends. Behind him is Kathy Laughlin, of Accounting. Photo by Fleur Hales.*

# OUR ENVIRONMENT

### What to Feed Bird Visitors

What wild birds like to eat and what many commercial bird mixes contain are not always the same, according to a recent report by Dr. Aelred D. Geis of the Patuxent Wildlife Research Center. His study, part of the U.S. Fish and Wildlife Service's Urban Wildlife Research Program, reveals some new findings on bird-food preferences — some apparently unknown to several of the birdseed companies that provide ready-mixed foods for millions of Americans who participate in this intensely interesting pastime.

"White proso millet and black oil-type sunflower seeds are eagerly taken," Geis said. "Yet, such common ingredients of commercial mixes as flax, canary, and rape (a type of mustard) seeds are rarely eaten by the birds."

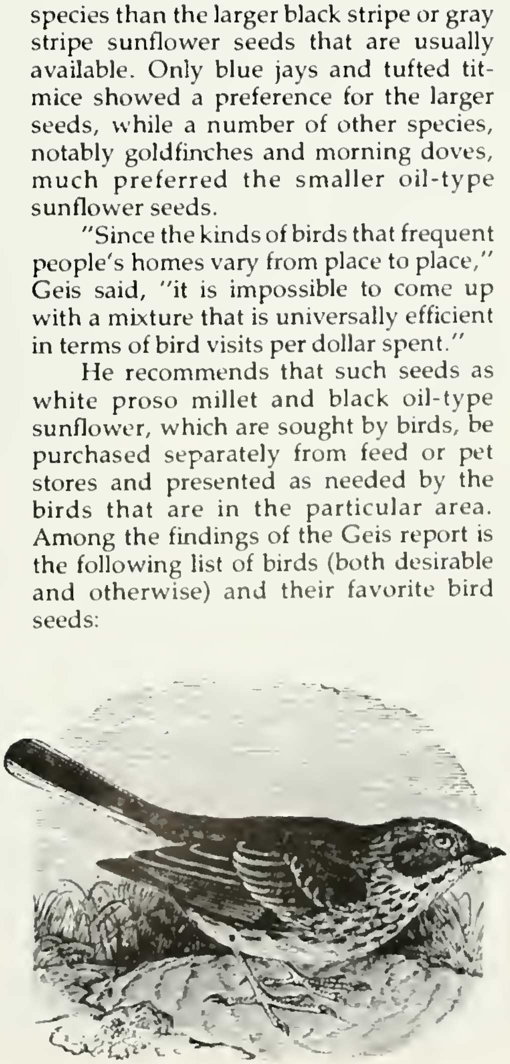
These and other findings of the report are based on 179,000 observations of feeding habits of birds in the Washington-Baltimore area. Though surveys are being continued in Maine, Ohio, and California, Geis expects that bird-food preferences will be quite similar throughout the nation.

"Milo or sorghum, wheat, oats, cracked corn, and rice," Geis said, "are common ingredients in commercial mixes, but are rarely attractive to birds if sunflower seeds or white proso millet are also present in the feeder."

Geis discovered that another common ingredient in mixes, peanut hearts, was especially attractive to starlings; thus, should not be used as bird food. The small, oil-type sunflower seeds were found to be more attractive to most bird species than the larger black stripe or gray stripe sunflower seeds that are usually available. Only blue jays and tufted titmice showed a preference for the larger seeds, while a number of other species, notably goldfinches and morning doves, much preferred the smaller oil-type sunflower seeds.

"Since the kinds of birds that frequent people's homes vary from place to place," Geis said, "it is impossible to come up with a mixture that is universally efficient in terms of bird visits per dollar spent."

He recommends that such seeds as white proso millet and black oil-type sunflower, which are sought by birds, be purchased separately from feed or pet stores and presented as needed by the birds that are in the particular area. Among the findings of the Geis report is the following list of birds (both desirable and otherwise) and their favorite bird seeds:



*American goldfinch:* hulled sunflower seeds, thistle seeds, oil-type sunflower seeds.
*Brown-headed cowbird:* white proso millet, red proso millet, German millet, canary seed.
*Cardinal:* all sunflower seeds.
*Carolina chickadee:* oil-type sunflower seeds (showed little interest in other bird seed).
*Dark-eyed junco:* red proso, white proso millet, canary seed, fine cracked corn.
*Common grackle:* hulled sunflower seeds, cracked corn.
*Evening grosbeak:* all sunflower seeds.
*House finch:* oil-type sunflower seeds (other sunflower seeds ranked much lower).
*House sparrow:* white proso millet (and most other seeds except flax and rape).
*Mourning dove:* oil-type sunflower seeds, white proso millet, thistle, wheat, buckwheat, milo, canary seed, hulled oats, cracked corn.
*Purple finch:* all sunflower seeds.
*Red-bellied woodpecker:* black-striped sunflower seeds (occasionally).
*Song sparrow:* White proso millet, red proso millet, oil-type sunflower seeds.
*Tufted titmouse:* peanut kernels, oil-type sunflower seeds. (Showed no interest in millet.)
*White-crowned sparrow:* oil-type and black-striped sunflower seeds, white proso millet, red proso millet. (Infrequent visitor to feeders.)
*White-throated sparrow:* all sunflower seeds, white proso millet, and peanut kernels, (Also use red proso millet, canary seed, fine cracked corn.)

# THE FIELD MUSEUM
## *Spotlight on The Collections*

### *By* MATTHEW H. NITECKI
*curator of fossil invertebrates*

Founded in 1893, the Field Museum of Natural History in Chicago is a nonprofit institution supported largely by private funds. Its present distinguished position is a result of its comprehensive scientific and educational programs. Building great collections has been a sustained goal of the Field Museum for more than 80 years. Through worldwide expeditions, exchange, purchase, and many notable gifts, the Museum collections have grown until they now number more than twelve million specimens. These collections represent major stages in the history of the earth and of human societies, and are concerned with the composition and evolution of the earth, its nearest neighbors, and all forms of life, past and present, nonhuman and human. They range from intensive coverage of geographic area, biotic group, or single culture to extensive coverage of a world biota or a broad culture area.

Each of the four scientific departments has had a different historical pattern of collection development and emphasis. Anthropology has focused on selected culture areas, amassing premier collections of primitive cultures and high civilizations of the past. Botany, while specializing in the vascular plants of Latin America, has attempted to build a collection as a representative index of the vegetation of the world. Geology, in the course of building research collections in the areas of immediate staff interest, has acquired a large systematic collection. Zoology has tried to develop worldwide collections in each of several taxonomic groups.

The collections of meteorites, Pennsylvanian and Permian fossil vertebrates and invertebrates, Central American plant specimens, tropical and neotropical birds and mammals, Oceanic and Tibetan ethnological artifacts, and primitive art are world-renowned. Research by

*This article originally appeared in the* ASC Newsletter Vol. 8, No. 5, *and is reproduced here with minor adaptations courtesy the Association of Systematics Collections.*

*This 1896 view of Field Museum (then known as Field Columbian Museum) was in what had been the Palace of Fine Arts [illegible] Columbian Exposition. Today [illegible] gone but some of the natural history [illegible] barely seen in the [illegible] in the collections [illegible] from that building [illegible] present one in Grant Park.* ➡

*Department of Anthropology Conservator Christine Danziger X-rays Neanderthal figure for determination of internal structure (1965). The figure, now on view in Hall C, was made in the early 1930s by U.S. sculptor Frederick Blaschke.*

TABLE I
RESEARCH COLLECTIONS AT FIELD MUSEUM
(SUMMER, 1980)

| | |
|---|---|
| Anthropology: | 800,000 |
| Botany: | 2,124,290 |
| Geology: | |
| Physical Geology: | 65,500 |
| Fossil Vertebrates: | 93,000 |
| Microscope Slides: | 5,800 |
| Fossil Plants: | 71,000 |
| Fossil Invertebrates (estimated): | 2,000,000 |
| Total Geology (Approx.) | 2,235,300 |
| Library: | 200,000 |
| Zoology: | |
| Reptiles & Amphibians | 212,000 |
| Birds: | 315,000 |
| Fishes: | 1,400,000 |
| Insects: | 2,680,000 |
| Invertebrates: | 2,500,000 |
| Mammals: | 122,000 |
| Total Zoology (Approx.) | 7,229,000 |
| TOTAL (Approx.) | 12,588,590 |

its own scientists or the research associates based on study of these collections is published in 225 volumes of four series of *Fieldiana*:* Anthropology, Botany, Geology, and Zoology.

The activities of the scientific staff include basic research, management of collections, and collaboration in public programs with the Departments of Education and Exhibition. The resources of the Museum have been made available to universities responsible for the training of graduate students. Seminars aided by study of specimens are held in Museum laboratories and classrooms. Museum specialists [illegible] many of whom [illegible] academic appo[illegible] of local universities [illegible] graduate classes and superv[illegible] The collections [illegible] sional staff play [illegible] of students wh[illegible] career[illegible] sciences.

The Museum scientific staff (Table 2) consists of 45 Ph.D's and its professional standing is reflected in the number of presidencies of scientific societies that present staff have held: American Malacological Union (Solem), American Society of Ichthyologists and Herpetologists (Inger), American Society of Plant Taxonomists (Nevling), Palaeontological Society (Raup), Society of Systematic Zoologists (Inger), Society of Vertebrate Palaentology (Turnbull) and Systematic Malacologists (Solem). Several members of the staff have received medals in recognition of their scientific contributions: National Science Foundation Antarctic Service Medal (Olsen), Order of Vasco Nuñez de Balboa of the Republic of Panama (Wenzel), and Charles Schuchert Medal of the Palaeontological Society (Raup).

## DEPARTMENT OF ANTHROPOLOGY

The anthropological collections of [illegible],000 cataloged lots or approximately 800,000 specimens are exhibited in 17 halls and housed in 8 storerooms. Constantly updated records on location, movement and condition of specimens will be a feature of a computerized collection catalog, the Anthropology Information Management System (AIMS). Work in research, conservation, and collection management is conducted in 9 laboratories.

Curatorial responsibilities tend to be divided along geographic lines: Asian archeology and ethnology (Bennett Bronson), Oceanic archeology and ethnology (John Terrell), North American archeology and ethnology (James VanStone, Ronald Weber), Middle and South American archeology and ethnology (Michael Moseley, Alan Kolata, Robert Feldman), and Middle Eastern archeology (Donald Whitcomb). Other curatorships are defined thematically: prehistory (Glen Cole) and primitive art and Melanesian ethnology (Phillip Lewis).

The nucleus of the department's collections was formed in 1894, when many of the anthropological objects for the 1893 World's Columbian Exposition were donated to or purchased by the new Field Columbian Museum. They included archeological and ethnological specimens from the United States (7 states, 12 Indian tribes), Middle and South America (12 countries), Asia (6 countries), and the Pacific. Although many of these early specimens are not well documented, a suprisingly high proportion (especially of American Indian objects) were collected in the field with great care by professional anthropologists. One of these, the renowned Franz Boas, helped to organize the new museum.

Boas was soon succeeded by W. H.

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*Fieldiana is [illegible]

TABLE II

SCIENTIFIC STAFF OF FIELD MUSEUM

Director: Lorin I. Nevling, Jr.
Dean of Science: David M. Raup

Department of Anthropology
Cochairman: Bennet Bronson
Cochairman: Phillip H. Lewis
Curators: Glen H. Cole
James W. VanStone
Curator Emeritus: Donald Collier
Associate Curators: Michael E. Moseley
John E. Terrell
Assistant Curator: Donald S. Whitcomb
Visiting Assistant Curators:
Robert A. Feldman
Alan L. Kolata
Ronald L. Weber

Department of Botany
Chairman: William C. Burger
Curator Emeritus: Louis O. Williams
Associate Curators:
John J. Engel
Patricio P. Ponce de Leon
Assistant Curator: Timothy C. Plowman
Visiting Assistant Curators:
Michael O. Dillon
Sylvia M. Feuer-Forster
Michael Nee

Department of Geology
Chairman (acting): Bertram G. Woodland
Curators: Matthew H. Nitecki
Edward J. Olsen
Eugene S. Richardson, Jr.
William D. Turnbull
Curator Emeritus: Rainer Zangerl
Associate Curator: John R. Bolt
Assistant Curators: Gordon C. Baird
Larry G. Marshall

Department of Zoology
Chairman: Robert K. Johnson

Division of Amphibians and Reptiles
Associate Curator: Harold Voris, Head
Curators: Robert F. Inger
Hymen Marx

Division of Birds
Associate Curator:
John W. Fitzpatrick, Head
Curators Emeriti: Emmet R. Blake
Melvin A. Traylor

Division of Fishes
Assistant Curator:
Donald J. Stewart, Head

Division of Insects
Associate Curator: John B. Kethley, Head
Curators Emeriti: Henry S. Dybas
Rupert L. Wenzel
Assistant Curator: Larry E. Watrous

Division of Invertebrates
Curator: Alan Solem, Head

Division of Mammals
Curator Emeritus: Philip Hershkovitz
Assistant Curator: Robert M. Timm

Holmes, an archeologist, who undertook important pioneering excavations in Yucatan and elsewhere in southern Mexico in the context of an interdisciplinary botanical-archeological expedition. His work resulted in the addition of approximately 1,000 Maya, Aztec, and Teotihuacan artifacts to the Museum's collections. The Museum has remained active in Latin American archeology since Holmes's day.

George A. Dorsey followed Holmes in 1896 and stayed in the chief curatorship long enough — until 1915 — to establish a highly personal style in departmental collections and research activities. His administration saw a sharp increase in funds and staff available for field work, and the development of a carefully articulated methodology for collecting objects. Major American Indian holdings continued to be assembled. An excellent Egyptian archeological collection was purchased, with remarkable skill, in Alexandria over a period of only three months. S. C. Simms, Fletcher Gardner, Laura Benedict, William Jones, and Fay-Cooper Cole were dispatched to the Philippines, where they painstakingly put together what would later be recognized as the largest and best-documented Philippine ethnological collection in the world. Albert Buell Lewis gathered an even larger and equally unmatched collection in Melanesia. And Berthold Laufer spent three years in China and Tibet laying the groundwork for yet another of the Museum's highly regarded collections.

Laufer succeeded Dorsey in 1915 and remained chief curator until his death in 1934. Departmental field work was vigorous in the 1920s. Major archeological projects were carried out by A. L. Kroeber in Peru, J. Alden Mason in Columbia, J. Eric Thompson in British Honduras, and Henry Field in Iraq. Ethnological projects included Laufer's continuing research in China and Ralph Linton's work in Madagascar. However, all this came to an end in 1929, when the Great Depression

*Mannequin figures atop the Pawnee earth lodge, Hall 5*

Ron Testa

forced most research activities back inside the walls of the Museum. The efforts of the Anthropology staff during the 1930s were focused on collections research and on an extensive WPA-supported renovation of exhibits.

Paul Martin became chairman in 1934 and stayed in that post for the next 30 years. Funds continued to be scarce during the early years of his administration. It was not until the late 1940s that conditions began to improve as the department learned to adapt to the postwar system of grants from public agencies and private foundations, rather than gifts from wealthy individuals. Martin himself conducted a long, important series of excavations in the American Southwest, and other members of the department worked for varying lengths of time elsewhere in the U.S. and in Middle and South America, the Pacific, Scandinavia, and Taiwan. Due to political realities in a changing world, the focus of departmental field work had shifted from collecting per se to an increased emphasis on problem-oriented fieldwork and on obtaining data rather than artifacts. Increasingly, new acquisitions were coming from purchases or gifts. In 1958 the Museum agreed to purchase the great Fuller Collection of 6,500 Oceanic artifacts; it subsequently received a major collection of Benin sculpture as a gift from Mrs. Fuller. In the early 1960s it acquired notable collections of Chinese materials.

A system of rotating chairman was instituted after Martin's retirement. Donald Collier, James VanStone, and Phillip Lewis have each occupied the chairmanship for several years during the past decade and a half. Lewis and Bennet Bronson are currently cochairmen.

*The American Collections* are important with special strength in materials of recent Indian groups of the Northwest Coast, Great Plains, southwestern U.S., and Brazilian tropical forest; ancient and recent Eskimos; and ancient cultures of the eastern and southwestern United States, Mexico and Peru. In all these areas the department's holdings rank with the top five in the country.

*The Middle Eastern-Egyptian-Mediterranean Collections* are uneven but of excellent quality. The purchased and hence poorly documented Egyptian materials cover an exceptionally wide range of periods and cultural activities, they include especially distinguished assemblages of Coptic textiles, [illegible] inscriptions, and Roman Egyptian objects. The excavated Middle Eastern collection is largely from a [illegible] — Kish — and [illegible] best-recorded [illegible] erian objects in the United States.

*The African Collections*, [illegible] weak, have real strength [illegible] areas: historic Benin and [illegible] Angola and Cameroon. The [illegible] holdings of Benin bronzes and ivories are at least as good as any outside Europe and Nigeria.

Dave Walsten

*Phillip Lewis, curator of primitive art and Melanesian ethnology, shown in 1977 with visitor David Lasisi, artist from Lossu, New Ireland. They hold a New Ireland carving from the Museum's collection.*

*The Asian Collections* vary greatly in size and quality. Tibetan materials in the Museum are numerous and comprehensive, covering most aspects of traditional Tibetan culture; only one other Tibetan collection in North America is as good. Chinese holdings are massive, but not as well balanced. They consist principally of (1) recent decorative art objects and folk textiles, (2) representative fine art objects of all periods, (3) rubbings of stone inscriptions and reliefs, (4) theatrical objects, (5) archeological metals, ceramics, and jade, and (6) materials relevant to the history of Chinese technology. Japanese holdings are currently being expanded greatly as the result of several recent gifts; they will soon exceed the Museum's poorly balanced South Asian holdings in number and utility for research and exhibition. Holdings from Island and Peninsular Southeast Asia are excellent, with particular strength in ethnographic materials from Sumatra, Java, Borneo, Malaysia, and the Philippines. All of these are the best of their kind in this hemisphere; the last is unmatched anywhere in size, age, and quality of documentation.

*The Pacific Collections* are distinguished by one of the world's two largest and best assemblages of ethnographic materials from Melanesia, with comprehensive coverage of almost all cultures in the coastal areas of the region. The Australian aborigine collection is fair and that from the Polynesian islands (especially New Zealand) good to very good. Micronesia is less well represented, but even here the department's holdings have moderate importance.

*The Prehistoric Collections* are composed principally of stone tools from France and sub-Saharan Africa. Their quality ranges from very good (by North American standards) for France and East Africa, through fairly good for South Africa and western Europe in general, to mediocre for the Middle East and poor for eastern Europe and Asia.

Outside interest in the North American and Asian collections is particularly intense; the latter alone are now studied by a yearly average of 115 visiting professionals and graduate students. Loans to other institutions are largely for exhibition purposes; the last three years have seen 56 such loans embracing 2,210 specimens.

Current in-house research by curatorial staff includes intensive work by Terrell, Whitcomb, and Cole on Melanesian, Egyptian, and African excavated materials, respectively; by VanStone on Russian documents relating to the history of native Alaskans; by Terrell on Pacific bark-cloth making; by Bronson on early Chinese iron metallurgy; and by Lewis on traditional art styles in New Ireland. Bronson, Moseley, Feldman, Whitcomb, Terrell, and Cole are engaged in writing up the results of recent archeological field work in Sri Lanka, Indonesia, Peru, Bolivia, Egypt, Papua New Guinea, and Tanzania. Continuing or imminent field projects include (1) a major study of environmental factors underlying agrarian collapse in ancient Peru (Moseley and Feldman), (2) excavations at a 1st millenium A.D. port site on the Red Sea in Egypt (Whitcomb), and (3) small-scale research and training excavations at sites of the same age in Indonesia (Bronson).

A substantial proportion of departmental effort is devoted to exhibition-related activities. Seventeen major permanent halls in the museum—slightly less than one-half of its total exhibition area — are anthropological. In addition, the department has in the past three years had responsibility for nine outside-originated temporary exhibits that have come to the Museum and has itself originated five temporary exhibits, while continuing to work on a very large new permanent exhibit of Northwest Coast Indian and Eskimo culture.

*To be continued next month*

# Edward E. Ayer Film Lecture Series

March and April

JAMES SIMPSON THEATRE

*Saturdays, 2:30 p.m.*

The entrance to Simpson Theatre is conveniently located inside the west entrance. This is of special interest to the handicapped, for the entrance is at ground level, with all steps eliminated. The west entrance also provides free admission to the theatre. Access to other Museum areas, however, requires the regular admission fee (except on Fridays) or membership identification. The film/lectures are approximately 90 minutes long and recommended for adults. Reserved seating available, until 2:25, for members. Doors open at 1:45 p.m.

March 7
"Tahiti" by Phil Walker
From Acapulco we travel on a 50-foot ketch across the Pacific, stopping briefly at the Galapagos and the Marquesas before reaching this fabled paradise. We visit a Tahitian luau; see coral reefs underwater, city scenes, pageants, and even parades.

March 14
"Germany" by Ed Lark
In beautiful Munich we visit the Marienplatz, with its bustling crowds, the famous Glockenspiel, and the Olympic Village; the Bavarian Alps, with some of Europe's loveliest scenery; Oberammergau, famed for its Passion Play; Neuschwanstein, with its fairyland castle; Baden-Baden; Cologne; and more!

March 21
"Immortal Poland" by Jon Hagar
This new look at the land of Chopin, Copernicus, and Madame Curie focuses on life in Poland today—from major industrial centers to the most scenic and historic regions. We see everyday life, industry, education, the arts, political realities, even a raft ride down the Dunajec.

March 28
"Shangri-La" by Jens Bjerre
In making this exciting film Bjerre travelled the Himalayas in small aircraft and jeep, walked and climbed for 28 days up to 17,500 feet to find his lost valley of paradise. There he was accorded the rare privilege of entering and filming "Shangri-La."

April 4
"Turkey" by Frank Klicar
Klicar guides us across the Anatolian Plateau, to the ruins of Troy, Pergamum, the hot springs of Pamukkale, the coast of the Black Sea. We view ancient frescoes, tobacco plantations, nomad villages, palaces, churches, and monasteries.

April 11
"Scotland" by Fran Reidelburger
Scotland's history, pageantry, industry; Loch Ness—home of the fabled monster, moss-grown castles, Highland games; agricultural fairs, farm life and city industries; the Isle of Skye, the Orkneys, and the Shetland Islands—all from the vantage point of Reidelburger's "caravan."

April 18
"Lure of Alaska" by Willis Butler
One of the most complete, comprehensive films ever made of Alaska, "Lure of Alaska" shows what the average tourist can see and do in relative comfort, without organizing an expedition. We travel from Ketchikan to Barrow and from Fairbanks to the Pribilof Islands.

April 25
"Amazon" by Ted Bumiller
We travel by raft and ship down the longest river in the world. We also see the colonial grandeur of Lima, seals and penguins of the Guano Islands, the mysterious Nazca plains, Machu Picchu, and an Inca festival.

# Kenya and the Seychelles

September 12–October 3
Tour Price: $3,750

FIELD MUSEUM TOURS

There Is Now, as there has always been, an aura of mystery surrounding Africa. Tropical islands and the coast, endless palm-fringed beaches, snow-capped mountains on the equator, jungle primeval, savannah sun-baked plains. They are all a part of East Africa, the home of one of our planet's last great natural dramas. The wildlife... the stately processions of giraffe—dark centuries silhouetted on the African horizon. Prides of lion—stalking the plains and still lauded as the king of beasts. The beautiful and rare leopard, the elegant cheetah and surely one of the wonders of the world, the magnificent migration of wildebeeste and zebra. Sadly, time and civilization move inexorably onwards so we hope to welcome you to Kenya and the Seychelles with Field Museum Tours in 1981.

Itinerary: Sept. 12: Evening departure from Chicago's O'Hare Airport via British Airways to London. 13: Morning arrival in London with time to rest before evening departure for Nairobi. 14: Morning arrival in Nairobi and transfer to Nairobi Hilton Hotel. Evening welcome party and lecture by member of the East Africa Wildlife Society.

15: Drive through Kikuyu country for overnight stay at Mt. Lodge Tree Hotel, the newest of the well-known Tree Hotels, designed for optimum game viewing from the comfort of your balcony. 16: Drive north and cross the equator to the Samburu Game Reserve. Overnight at Samburu Game Lodge.
17: Full day game viewing at Samburu Game Reserve. 18: Drive south to spend the day at the foot of Mt. Kenya at the luxurious Mt. Kenya Safari Club.
19: Journey to Lake Naivasha, a bird-watcher's paradise. Overnight at the Lake Hotel. 20: Drive through the Masai Mara Game Reserve for two days of game viewing by minibus in the Great Rift Valley. Overnight at the Governor's Camp. 21: Full day at Masai Mara Game Reserve, including a game walk.
22: Return to Nairobi and the Nairobi Hilton Hotel. 23. Journey to Amboseli National Park, dominated by the spectacular Mt. Kilimanjaro. 24: Morning lecture by research naturalist discussing studies of wildlife behavior. Afternoon trip to Tsavo West. Overnight at Ngulia Lodge. 25: The safari continues through the plains of Tsavo to Taita Hills Lodge for lunch. Continue to the port city of Mombasa on the Indian Ocean. Overnight at the Leopard Beach Hotel.
26: Morning visit to Shimba Hills Reserve. Afternoon free. 27: Morning departure for Mahe in the Seychelles Islands. Afternoon arrival at Reef Hotel.

28–30: Three days in the Seychelles includes a full day excursion by air to Praslin Island to visit Vallee de Mai and by boat to Cousin Island to visit the internationally renowned bird sanctuary. Optional full day excursion by air to Bird Island. Oct. 1: Free day in Mahe. Evening flight to Nairobi, late night flight to London. 2: Morning arrival in London. Free day to relax and explore on your own. Overnight at London Embassy Hotel. 3: Late morning flight to Chicago via British Airways.

**For a brochure on this or any of our other tours please write or call the Tours office at Field Museum, 322-8862.**

# Papua New Guinea

May 1–17
Tour Price: $4,461

FIELD
MUSEUM
TOURS

Papua New Guinea is unique on the face of the planet Earth. For millenia (or untold time) a diversity of contrasting cultures have flourished here within small areas because of the isolation imposed by rugged terrain of mountains and jungles, and because of hostilities between the many different peoples. Largely unknown to each other and to the outside world they coexisted, each in a communal environment sufficient unto itself. Only since contact with modern industrial society has this isolation been broken, making it possible for visitors to explore and exclaim over the natural wonders of this Edenlike paradise.

It is one of the most remarkable—and last—reservoirs of animal, reptile, insect, and bird life to be found anywhere. But most of all, Papua New Guinea presents a variety of cultures and art of such freshness and color it holds a fascination beyond all else. Each province has its own charm, whether it be the all-green towering Eastern Highlands, or the expansive vistas of the Sepik watershed. To travel through the continuing contrasts of this ever-changing land is to experience a travel adventure that broadens the mind as it enriches the soul. To go from the beginnings of the Space Age to the remnants of the Stone Age in the course of a couple of days cannot fail to be an adventure of mind-bending proportions.

Travel Plans International

Travel Plans International

The Sepik River is a monster waterway draining a vast area of grassland, swamp, and jungle in its serpentine circuit. For five memorable days we will cruise the Sepik, reaching into the past in remote regions where the villagers still travel in traditional dugout canoes. They still reside in enormous tree houses though not for the long ago purpose of escaping head-hunting raiding parties. They still make and use fanciful owl-head pots and carve copious crocodiles and hornbills, symbols of fertility and life. They continue to keep their most treasured possessions hidden away or buried, only bringing them out on special occasions. And they still create some of the country's most artistic artifacts.

Our lecturer, Dr. Phillip Lewis, curator, primitive art and Melanesian ethnology, will escort the tour from Chicago, and share his knowledge of the varied arts and cultures of Melanesia. In addition, our Sepik director, Jeff Leversidge, a well-known personality on the Sepik and Ramu Rivers, and very knowledgeable about the diverse cultures, arts, and customs of the Sepik regions, will lecture the group during the cruise and shore excursions.

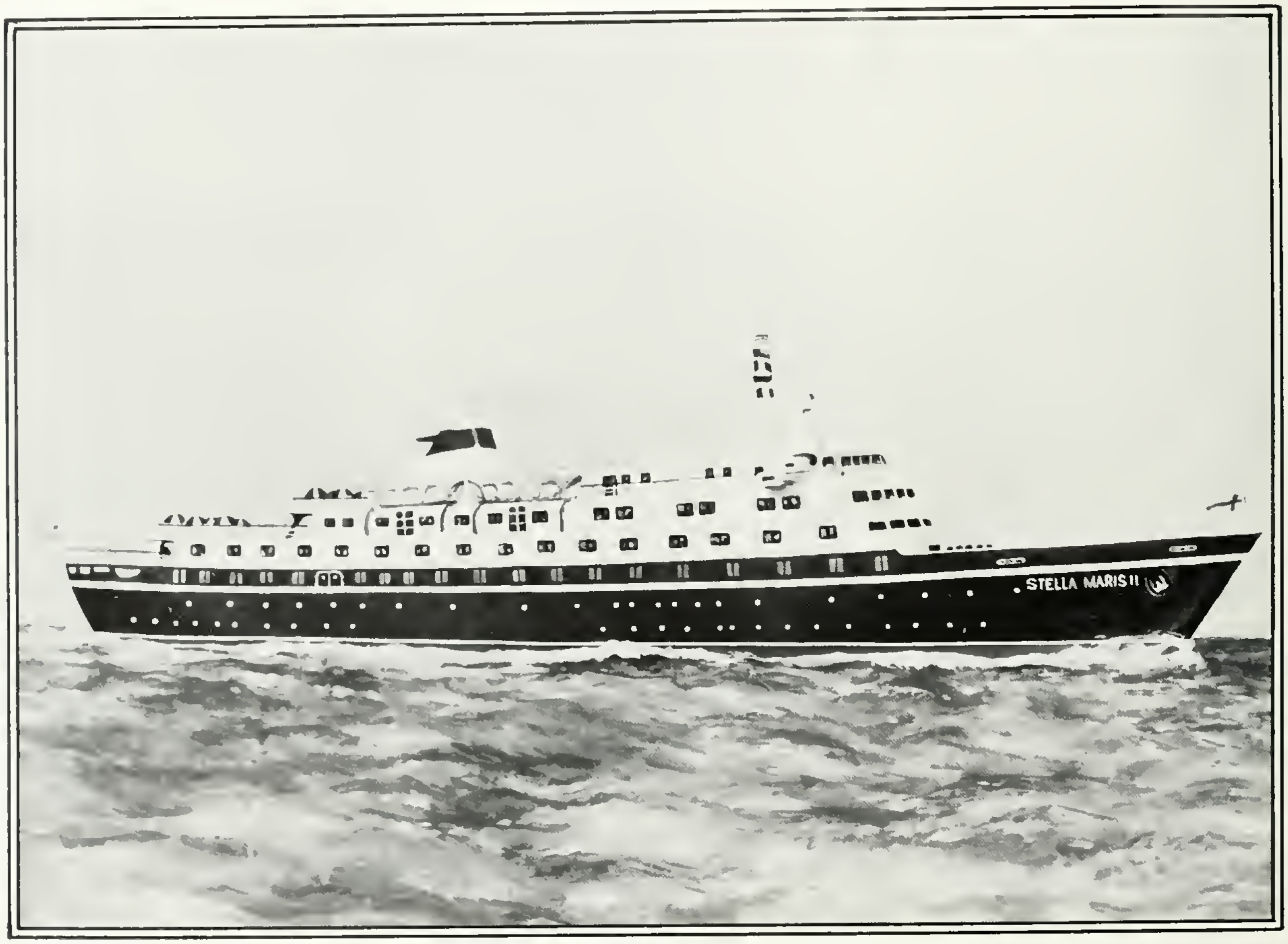
Accommodations on board the newly refurbished *Melanesian Explorer* are modern and comfortable. Passengers are housed in air-conditioned twin-bunked cabins, each with private bath. Above the cabins is a lovely dining and lounge area, while the top deck, aft, is fitted with lounges and chairs so that passengers may watch the Sepik water world go by in pleasurable ease.

To ensure your reservation, call or write the Tours office now.

# *Journey to the Holy Land and the Red Sea*

## A cruise on the Red Sea aboard the *Stella Maris*, followed by a stay in Cairo and Israel

### March 12–26



*Stella Maris*

You Are Invited to participate in an extraordinary itinerary that affords a wealth of visual and intellectual experiences unmatched in the world of travel:

Following a transatlantic flight, participants will land at Cairo and transfer to the port of Suez to board the cruise ship, *Stella Maris*, and sail leisurely on a Red Sea cruise. Ports of call include several along the shores of this ancient sea, where centuries have made little change. From each port, excursions will reveal sites of unforgettable beauty and grandeur.

The overnight excursion to Luxor will recall the golden age of Egypt's power when the wealth of Thebes was showered upon the god Amon-Ra. A tour of ancient Petra in Jordan will reveal a site in an incomparable setting, with an opportunity to visit the Monastery of St. Catherine, built in the 6th century on Mt. Sinai.

The cruise will be followed by two nights in Cairo. Hotel accommodations will [illegible] of the pyramids of Giza. From Cairo, tours will be [illegible] Memphis and Sakkara, the pyramids [illegible] Egyptian Museum of Antiquities. F[illegible] Israel for a four-day [illegible] Jerusalem Hilton. In Israel, [illegible] visits to Mount of Olives, the Old City and sites of Jerusalem, Masada, Bethlehem, and Jericho.

Tour lecturer will be Donald S. Whitcomb, assistant curator of Middle Eastern archeology. Dr. Whitcomb, who also led Field Museum's recent tour to Greece, has had field excavation experience in Egypt, Oman, Iran, and Syria, as well as museum and research experience: as consultant in Islamic archeology, Comprehensive Survey of Saudi Arabia; and as research assistant for the Comprehensive Survey of Saudi Arabia, 1976. (Included in this tour's itinerary is the Red Sea port of Quseir al-Qadim, a site where Whitcomb is in charge of continuing excavations.)

The *Stella Maris* is a ship of 4,000 gross tons and 297 feet in length. Originally built in the early 1960s, it was completely rebuilt in 1965 as a one-class elegant cruise yacht.

The price of this tour depends upon the type of accommodation chosen: $3,625 to $3,995 based upon double occupancy. A few large staterooms aboard the *Stella Maris* will accommodate a third person in an additional upper berth at a rate of $2,925. For a full breakdown of tour rates, itinerary, and other details, please call the tours office (322-8862) or write for a brochure.

# Peru and Bolivia: 1981 *October 15 to November 1* *Tour price: $3,100*

A Different Experience! A Different World! From the fabulous Incas, through Spanish Colonial times to the modern cities of today — yet maintaining its Latin charm. You'll love the green fertile valleys along the sandy desert coast of Peru; the highest railroad in the world; crossing Titicaca, the world's highest navigable lake by hydrofoil; flying over the Nazca plains. Our tour includes the fascinating cities of Lima, Cuzco, Trujillo, Puno, a train trip to fabulous Machu Picchu, and four full days in La Paz.

Dr. Alan L. Kolata, visiting assistant curator of South American archeology and ethnology, and project director, Field Museum Expeditions to Bolivia, will accompany the tour members during the entire trip. Dr. Michael E. Moseley, associate curator of Middle and South American archeology and ethnology, who for the past ten years has directed large-scale projects on the north coast of Peru, will join the group when we visit his area of research. We will also have an opportunity to see and learn about Dr. Kolata's work at Tiahuanaco. For more information call or write Field Museum tours. Direct telephone line: 322-8862.

*Two views of Machu Picchu, by Hermann Bowersox*

FIELD MUSEUM TOURS

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# *February and March at Field Museum*

*(February 16–March 15)*

### Continuing Exhibits

CULTURES OF AFRICA AND MADAGASCAR. Dramatic bronze statues cast in the ancient Nigerian kingdom of Benin demand special attention here. Bronze-casting in Benin reached high levels of technical skill and beauty during the 15th–19th centuries, resulting in some of the finest art ever produced in Africa. The exhibit, which includes a fully furnished reconstruction of a Cameroon king's house, shows the life and customs of various African peoples through their art, tools, weapons, and pottery.

THE BIRDS OF AMERICA. John James Audubon's rare elephant folio edition of *The Birds of America* is one of America's ornithological landmarks. The Museum's set is one of two with an additional 13 plates. The four volumes, containing 448 plates, consist of life-size, hand-colored copperplate engravings of all American birds known to Audubon. The book was published in London between 1827 and 1838.

### New Programs

AFRO-BLUE. A celebration of West African musical heritage as it lives in America. The program features Chicago musicians in concert and ethnographic films that trace the African influence on jazz in the early part of the 20th century. "Afro-Blue" depicts a musical tradition so strong that it survived the savage journey to the New World and slavery. Join host Neil Tesser, *Chicago Sun-Times* jazz critic, and a variety of talented performers for an exhilarating musical experience. "Afro-Blue" is presented in conjunction with the Winter Learning Museum course, "West African Art: Power and Spirit," and made possible by a grant from the National Endowment for the Humanities, a federal agency. Saturday, Feb. 28, 2 p.m., James Simpson Theatre. Call 322-8855 during business hours to order tickets in advance, or purchase them at the door. Members $3, nonmembers $5.

EDWARD E. AYER FILM LECTURES. These colorful programs are held each Saturday during March and April at 2:30 p.m. in Simpson Theatre. Narrated by the filmmakers themselves, the programs are recommended for adults. Admission is free at the Museum's West Door. Reserved seating is available for Members until 2:25 p.m. For program details see page 23.

WEEKEND DISCOVERY PROGRAMS. Each Saturday and Sunday between 11 a.m. and 3 p.m., [illegible] participate in a variety of free tours, demonstrations, and films on natural history topics. Check the *Weekend Sheet* available at Museum entrances for locations and additional programs.

☐ "African Religions and Ritual Dance" [illegible] presents dance as an integral part of Afr[illegible] reenactment of a Yoruba cult dance. Saturday, [illegible]

☐ " Prehistoric People in the Illinois Valley" tour investigates how prehistoric people adapted to their environment through the use of tools. Sunday, February 22, 1 p.m.

☐ "Chinese Ceramic Traditions" is a tour of masterworks in the permanent collection, exploring the styles, innovations, and triumphs of China's 6,000 years of ceramic art. Sunday February 22, 2:30 p.m.

☐ "Atumpan: The Talking Drums of Ghana" film discusses the major role of ceremonial drums in the ritualistic installation of a chief. Saturday, February 28, 1 p.m.

☐ "Sea Ceatures" film brings you an unusual parade in the depths of the ocean. Sunday, March 1, 1 p.m.

☐ "Indians of North America" tour surveys the daily life of six tribes. Saturday, March 7, 2:30 p.m.

☐ "The Saga of the Sea Otter" film presents playful sea otters cavorting with their families and talks about the efforts to save them from extinction. Sunday, March 8, 1 p.m.

☐ "Welcome to the Field" tour provides the Museum visitor with a view of behind-the-scenes activities of a natural history museum. Sunday, March 8, 2 p.m.

☐ "The Great Bronze Age of China" slide program presents highlights from the extraordinary exhibit that was at Field Museum last year and is currently traveling the United States. Saturday, March 14, 12:30 p.m.

☐ "Adaptation to Ocean Environments" film illustrates animal adaptations to three types of ocean environments: the open ocean, the sandy bottom, and the rocky reef. Sunday, March 15, 1 p.m.

☐ "The World of Gold" is a half-hour survey of gold: its uses, physical properties, and mining procedures. Sunday, March 15, 2 p.m.

### Continuing Programs

VOLUNTEER OPPORTUNITIES. Persons with scientific interests and backgrounds are needed to work in various Museum departments. Contact the Volunteer Coordinator, 922-9410, ext. 360.

FEBRUARY AND MARCH HOURS. The Museum is open 9 a.m.–4 p.m., Monday–Thursday (until 5 p.m., beginning March 1); 9 a.m.–9 p.m., Friday; and 9 a.m.–5 p.m. Saturday and Sunday.

THE MUSEUM LIBRARY is open weekdays 9 a.m.–4 p.m. Obtain a pass at the reception desk, main floor. Closed Feb. 16, Washington's birthday.

Museum Telephone: (312) 922-9410

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# IELD MUSEUM OF NATURAL HISTORY BULLETIN

March 1981

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# Field Museum of Natural History Bulletin

March 1981
Vol. 52, No. 3

*Editor/Designer:* David M. Walsten
*Production:* Martha Poulter
*Calendar:* Mary Cassai
*Staff Photographer:* Ron Testa

## Field Museum of Natural History

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COVER

*Road sign in the Australian outback. See "Kimberley Snail Hunt Again!" p. 18. Photo by Alan Solem.*

Field Museum [illegible] monthly except [illegible] Road at [illegible] $[illegible] schools. Museum [illegible] are [illegible] ted [illegible] form 3579 [illegible] Chicago [illegible]

# FIELD BRIEFS

*Komodo dragon, Hall 18*

## "Komodo Dragon": Lecture March 29

Walter Auffenberg, Florida State Museum curator of herpetology, and professor of zoology at the University of Florida, offers an illustrated lecture on the Komodo dragon of Indonesia Sunday, March 29. The lecture, which is free, will be held at 2:00 p.m. in A. Montgomery Ward Hall (Lecture Hall 1).

Dr. Auffenberg's presentation emphasizes the social and feeding behavior of the Komodo dragon, a living relic of 60 million years ago. Also known as the Komodo monster, it is the largest lizard on earth — some reach a length of 10 feet and weigh 250 pounds. Adults are highly successful predators of live animals and feed largely on deer. They are good runners, effective climbers, strong swimmers, and capable divers. Dr. Auffenberg and his family lived for nearly a year on the island of Komodo, making a comprehensive study of the behavior and ecology of these extraordinary reptiles.

## High School Anthropology Course Funded for Sixteenth Summer

A National Science Foundation grant has again been awarded, in nationwide annual competition, to Field Museum's Department of Education to conduct a six-week tuition-free, college-level course in anthropology for high-ability, highly motivated high school students from June 22 through July 31.

While students completing their junior year this June must be given preference, the application of any student now in high school will be considered in selection of the 27 participants in the program. Applicants living beyond commuting range of the Museum are welcomed if they submit letters approving their staying with a specific relative or family friend in our area during the course.

Anthropology appears in few high school curricula, and this course affords opportunities, otherwise unavailable to secondary students, to test a career interest before college selection. Participants become aware of the wide range of specialized fields within anthropology which allows a combination of interdisciplinary courses in college, thus holding open their options in the job market. The archeological field director and two other members of our 1981 guest faculty are former partic-

Edward Lace

*Anthropology course dig site*

pants who were introduced to anthropology through this NSF-Museum course in 1969 and 1970.

For the first four weeks, and the sixth, the class meets from 9:15 a.m. to noon and 1:00 to 3:00 p.m. During the fifth week, the Dig, our charter bus leaves the Museum at 9:00 a.m. and returns at 5:00 p.m. The first four weeks build up a background of understanding the *living* of people, in various environments and from earliest times to the urbanized present. Mini-courses (8 to 10 hours) on *Early Man* by Dr. Ronald Singer, University of Chicago physical anthropologist, and *Midwestern Prehistory* by Dr. Stuart Struever, Northwestern University archeologist, present the spread of mankind throughout the Old and New Worlds. Field Museum anthropologists and guest experts from university faculties then compare the development of civilizations in the Near East, Africa, and China with Mexico and demonstrate environmental adaptations in North American Indian culture areas, focusing on the continuous occupation of our own Chicago region.

Lecture sessions illustrated with Museum specimens, slides, and films, alternate with hands-on experience in workshops and archeology lab sessions, behind-the-scenes tours, and explorations of anthropology exhibit halls, and with film-based discussions and reports by the participants themselves. On two afternoon field trips, John Aubrey presents ethnohistoric documentation at Newberry Library of Indian-White contacts and William Adelman, urban historian with the University of Illinois Labor Relations Education Program, makes visible Chicago's ethnic history by leading us through some of its oldest neighborhoods.

By the fifth week of the course it is not as relic-hunters but with a feeling for the human activities they'll find recorded beneath their feet that the students engage in their own week-long dig. Each class contributes to a continuing research program in the little-known prehistory of our own area.

A newly discovered site on the Little Calumet River was opened last summer. It promises clarification of the relationship between two cultural traditions that met in the Chicago region in late prehistoric times. Archeological literature has assumed that intruding Indians of the "Mississipian" Culture overrode (wiped out? drove away?) the less highly organized indigenous "Late Woodland" Indians. However, evidence from our previous excavation on the Des Plaines River suggests the alternative of peaceful coexistence, allowing a blending of cultural traits, in ceramics at least. Similar "hybrid" pottery at the surface of the Little Calumet site overlies a thousand-year-long Woodland cultural tradition here. And on the last afternoon of the 1980 dig seven large post molds appeared, outlining the curved end of what should prove to be an oval structure typical of the Late Woodland winter house, as shown in the small Sauk-Fox diorama in Field Museum's Woodland Indian Hall 5. We look forward to completing its excavation this summer and hope to find associated hearths and storage pits that should contain evidence both of seasonal activities and of cultural relationships.

A brochure and application forms (to be returned to the Museum by April 7) may be obtained from the Department of Education or by calling the program director, Harriet Smith, (312) 922-9410, extension *361*.

*—Harriet Smith, project director,*
*NSF Summer Anthropology Program*

# Fieldiana: 1980 Titles

Fieldiana is a continuing series of scientific papers and monographs in the disciplines of anthropology, botany, zoology, and geology; the series is intended primarily for exchange-distribution to museums, libraries, and universities, but all titles are also available for public purchase.

The following titles, published during 1980, may be ordered from the Division of Publications. Members are entitled to a 10 percent discount. Publication number should accompany order. A catalog of all available *Fieldiana* titles is available on request. (Please specify discipline: anthropology, botany, geology, or zoology.)

Fieldiana: Anthropology

1305. "The Bruce Collection of Eskimo Material Culture from Kotzebue Sound, Alaska," by James W. VanStone. New Series Number 1. $14.50.

Fieldiana: Botany

1306. "R[illegible] American Saurauia (Actin[illegible]," [illegible]. New Series [illegible].

1311 "A M[illegible] (Hepaticae)," [illegible] Number 5. $[illegible]

13[illegible] "Flora [illegible] Burger, Editor). New Series Number 4. $34.00.

1314. "Flora of Peru. Conspectus and Index to Families. Family Compositae: Part I," by J. Francis Macbride and collaborators (Alwyn H. Gentry, Michael O. Dillon, and Samuel B. Jones). New Series Number 5. $7.50.

Fieldiana: Geology

1308. "Amphibia and Reptilia from the Campanian of New Mexico," by J. Gail Armstrong-Ziegler. New Series Number 4. $[illegible].

1310. "Systematics of the South American Marsupial Family Caenolestidae," by Larry G. Marshall. New Series Number 5. $9.50.

Fieldiana: Zoology

1304. "Species of the Scincid Genus Dasia Gray," by R. F. Inger and W. C. Brown. New Series Number 3. $2.50.

1307. "The Bats of Iran: Systematic, Distribution, Ecology," by Anthony F. DeBlase. New Series Number 4. $23.50.

1309. "The Contemporary Land Mammals of Egypt (Including Sinai)," by Dale J. Osborn and I. Helmy. New Series Number 5. $23.50.

1312. "Ticks (Ixodoidea) from Wild Sheep and Goats in Iran and Medical and Veterinary Implications," by Harry Hoogstraal and Raul Valdez. New Series Number 6. $1.75.

# RESEARCH AT FIELD MUSEUM

UNTIL RATHER RECENTLY, geologically speaking, North and South America were separated by an oceanic barrier. The Caribbean and Pacific oceans were connected across what is now northwestern Colombia and southern Panama, and this water gap served as an effective barrier to dispersal of animals between the Americas. Then, about 3 million years ago, the Panamanian land bridge came into existence and united the Americas. As a consequence a new route was established which permitted the reciprocal intermingling of the long-separated North and South American faunas. Across this land bridge occurred the most spectacular interchange of its kind recorded in the fossil record.

Field Museum assistant curator of fossil mammals, Larry G. Marshall is studying aspects of this amazing interchange. A major point of interest is: when exactly did the land bridge appear and when did the North American groups begin arriving in South America and the South American groups in North America? This question is being answered by study of the ages of the rocks in South America, primarily in Argentina, in which the earliest of the North America immigrants occur. The ages of these rocks are being determined by radioisotope methods by colleagues Garniss Curtis and Robert Drake, of the Department of Geology and Geophysics, University of California, Berkeley.

Dr. Marshall is also attempting to document which animals went in which direction. It is now known that included among the animals in North America which came from South America are the living porcupine, opposum, armadillo, and the fossil giant ground sloths, glyptodonts and capybaras. Of the North American groups which went to South America are dogs, cats, skunks, bears, mastodonts, horses, camels, deer, peccaries, rabbits, mice, squirrels, and shrews. In order to understand the direction of dispersal of these groups it is necessary for Marshall to first study the pre-land bridge fossil faunas in both North and South America.

Lastly, Marshall is attempting to study the effects which this reciprocal interchange had on the respective faunas. For example, it is tempting to conjecture that the disappearance of some native South American groups in South America was a consequence of the interchange and that they were replaced by North American invaders. Thus, Marshall is studying the consequences of the mingling, interaction of the faunas, and their integration into faunas of quite different composition. An historical perspective must thus be used in order to understand the present distribution of animals in North and South America.

This research is being funded by a three-year National Science Foundation grant which for year one (1980-81) awarded $43,000; the awards for year two ($47,000) and for year three ($44,500) are expected pending availability of funds and the scientific progress of the project. Marshall is a co-principal investigator with California's Garniss Curtis, and this work is being carried out as a joint research project with Rosendo Pascual, Museo de La Plata, Argentina and the Argentine research organization CONICET.

Dave Walsten

*Larry G. Marshall holds the fossil skull of a giant ground sloth from South America, a form very similar to the ones which came to North America across the Panamanian land bridge.*

---

*Marshall's work in paleontology is one of numerous ongoing research programs at Field Museum in anthropology, botany, geology, zoology, and interdisciplinary studies; a selection of these programs will be featured regularly in forthcoming issues of the* Bulletin.

# THE FIELD MUSEUM
## *Spotlight on The Collections*

### Part II

*By* MATTHEW H. NITECKI
*curator of fossil invertebrates*

### DEPARTMENT OF GEOLOGY

In addition to the systematic collections of about 2,230,000 specimens and the general Museum supporting facilities, there are rock and fossil preparation laboratories, radiographic equipment, computers (including terminals for remote access to larger centers), an x-ray diffraction laboratory, reprint collection of 20,000 titles and a map library of more than 100,000 items. Two curators are physical geologists (Olsen and Woodland) three are invertebrate paleontologists (Baird, Nitecki, and Richardson) and three are vertebrate paleontologists (Bolt, Marshall, and Turnbull).

The Museum acquired its first collection of [illegible] from the World's Columbian Exposition [illegible]. Expeditions to the Badl[illegible] and to the Medicine Bow Mountains in Wyoming began a long tradition of field parties, and expeditions to such places as the Canadian Arctic, Antarctica, Argentina, and Australia.

The first chairman was Oliver C. Farrington, who came to the Museum in 1893. Farrington published over 100 papers in mineralogy, with particular emphasis on meteorites. He built these collections into worldwide importance, and today the department's meteorite collection is without peer.

Henry W. Nichols, who specialized in mineralogy, was the second chairman. Sharat K. Roy, the third chairman, studied in his native India, London, and Illinois. He led a number of Museum expeditions, including those to Baffin Land and Labrador in 1927-28, and published on invertebrate fossils and meteorites.

Rainer Zangerl became head of the Department in 1962 after serving 17 years as curator of fossil reptiles. His main areas of research are the lower vertebrates: he has published extensively on fossil turtles and chondrichthyian fishes. Zangerl extended his interest to Pennsylvanian paleoecology, and his now classic memoir on paleoecology of Pennsylvania black shale was coauthored with Eugene Richardson. Zangerl presided over the First North American Paleontological Convention held at the Field Museum in 1969

Zangerl was succeeded as chairman by Edward J. Olsen in 1974, who came to the Museum in 1960 after teaching at Case Institute of Technology and Western Reserve. Olsen, who received his

**Top:** *Bringing home the bacon—er, venison. While in the field, paleontologist Elmer S. Riggs (in the lead) spent time looking for provisions as well as for dinosaurs. This scene occurred during 1899-1900 expedition into northwestern Colorado. Note "Field Columbian Museum" pennant over tent.* **Bottom:** *Assistant on 1899-1900 expedition seems to be pondering how the huge* Brachiosaurus *bone can be transported back to Chicago.*

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*This article [illegible] Newsletter [illegible] here with minor adaptations [illegible] Association of Systematics Collections.*

*Turn-of-the-century view of geology preparator's lab, with preparator H. W. Menke (left) and curator Elmer S. Riggs.*

Ph.D. from the University of Chicago, is an authority on meteorites.

David M. Raup succeeded Olsen as chairman in 1978. An invertebrate paleontologist, his special interests include crystallization as it relates to life, computer-based paleobiometrics, and modeling in paleontology. In 1980 Raup was named dean of science, a new post with responsibility for the four curatorial departments, the Library, Advanced Technology Laboratories, and the Center for Advanced Studies. Succeeding Raup, as acting chairman, was Bertram G. Woodland, curator of petrology.

*Invertebrate Paleontology.* The number of specimens of fossil invertebrates is estimated at about two million, of which about 18,500 are types. The types include representatives of approximately 8,600 species and subspecies. Of these one half is fully documented and listed in 18 published catalogs. The collection has been recognized as the third most significant and useful collection of invertebrate fossils in North America.

The level of outside use of the collection in 1978 is best summarized by the number of loans (95), accessions, (70), and visitors (292). The number of papers in which the type specimens were described is conservatively estimated at 1,250.

The collection includes an extensive representation of the Paleozoic of the Mississippi Valley. Particularly important are Ordovician through Pennsylvanian fossils from the margins of the Illinois Basin. There are no comparable collections in existence.

A number of invertebrate curators have been active on Middle Paleozoic invertebrates. In 1946, Eugene Richardson, Jr. joined the Museum as a curator of fossil invertebrates. His first activity involved the installation of the Hall of Fossil Invertebrates, reproductions of which are found in many standard textbooks of paleontology. Richardson's research concentrates on the Mazon Creek biota; as a result the Museum has the most comprehensive collection of nonmarine and marine soft-bodied animals not otherwise represented in the fossil record. His research has significantly altered our understanding of Pennsylvanian biota. In addition to describing the most celebrated of them all, a dirigiblelike orphan in search of a phylum, *Tullimonstrum gregarium,* Richardson and his colleagues have published on over 80 species. A symposium on Mazon Creek fossils, edited by Nitecki, was published in 1978 and it contains eleven contributions from the Museum staff and associates

In 1965, the collection of Walker Museum of Paleontology of the University of Chicago, the most important university collection of fossil invertebrates in the U.S. was transferred to the Museum. At that time, Matthew H. Nitecki joined the Museum curatorial staff as the second curator of fossil invertebrates. Nitecki's earlier work on the Paleozoic sponges and problematica has led him to study receptaculitids and cyclocrinitid algae. For his monographs on cyclocrinitids and receptaculitids Nitecki collected extensively, and the Museum has receptaculitid fossils from Afghanistan, Burma, Australia, Siberia, North America, and South America.

Gordon C. Baird joined the staff in 1976 as assistant curator of fossil invertebrates. Baird's research is in paleoecology and include the study of erosional events in Devonian of New York shelf seas, and Mazon Creek biogeography, autecology and depositional processes. In 1979, he collected more than 90,000 fossil specimens in his various Pennsylvanian studies.

[illegible] spectrograph used in research and routine work in [illegible] analysis.

*Vertebrate Paleontology.* There are approximately 93,000 specimens of fossil vertebrates including about 500 primary types and many thousands of described and figured specimens. Close to 80% of the collection is cataloged. All catalogs (except for fossil fishes) are completely computerized. An important histological slide collection of vertebrate hard structures is maintained. In 1978, there were 130 visitors (not including class groups) and 25 loans (not including 300 outstanding as of February 15, 1978). Many publications and monographs have been produced as the result of research on these collections. New additions to the collections and the growing corpus of publications have been consistently enhancing its scientific value.

The collections are organized according to the traditional areas of curatorial responsibility: fishes, amphibians and reptiles; birds; and mammals. Each is individual in scope, organization and problems.

Silurian and Devonian agnaths and placoderms, mostly from western North America; Pennsylvanian fishes from the Mazon Creek localities; Pennsylvanian chondrichthyans and paleniscoids from black shales of Indiana and Illinois are major strengths of the fish collection. The collection of primitive fishes was built to one of world-renown by former curator Robert Denison and most of the growth over the last 20 years was due to him and to Rainer Zangerl. Zangerl is monographing the Paleozoic chrondrichthyans, and continues to add several hundred specimens per year to the collection.

The collection of reptiles and amphibians includes the outstanding Walker Museum collection from the North American Lower Permian with its fine labyrinthodont and lepospondyl amphibians, and cotylosaurian and pelycosaurian reptiles. This material was acquired and studied over a period of about 75 years by Williston, Romer, Olson, and their students, and is one of the most important collections of Permian tetrapods in the world. There are also major collections of fossil turtles from the Cretaceous of Alabama, the Eocene of Wyoming, and the Oligocene of the Dakotas, Nebraska, and Wyoming, largely collected by Zangerl and Turnbull, as well as significant dinosaur, mososaur, lizard, and crocodile collections. John R. Bolt joined the staff as assistant curator of fossil reptiles and amphibians in 1972. His research interests are the origin of the living Amphibia, tooth replacement, and octic evolution and function.

The collection of mammals is one of the top five or six collections of fossil mammals in North America. Major strengths are in: Tertiary of North America (mainly the mountain states where late Paleocene, Early, Middle, and Late Eocene faunas from Colorado and Wyoming are noteworthy, and the Oligocene faunas of Nebraska, South Dakota, and Wyoming are classic); Cretaceous of Texas, Mid-to-Late Tertiary of South America, and the Latest Tertiary and Quaternary of Australia. There is good representation of North American Late Tertiary and Pleistocene.

Elmer S. Riggs was largely responsible for assembling the nucleus collections in vertebrate paleontology. He collected many dinosaurs from Colorado, Wyoming, Utah, and western Canada and led several expeditions to South America, mainly Argentina and Bolivia, where he amassed the Museum's outstanding Tertiary mammal collection. Bryan Patterson, on the resident staff from 1926 to 1955, published many morphological studies on the Riggs mammals. Patterson also collected and published on one of the first significant Paleocene fossil vertebrate faunas. His publication on the mesozoic metatherian-eutherian grade mammals from North Texas is now a classic. He subsequently became an Agassiz Professor at the Museum of Comparative Zoology, while retaining a research associateship at Field Museum. He was a member of the National Academy of Sciences.

William Turnbull works on Early Tertiary (Washakie) and Mesozoic mammilian faunas, on Late Tertiary Australian faunas, and on functional morphology of the masticatory apparatus. Larry Marshall is actively carrying on the work of Riggs and Patterson on the South American Tertiary. He is accumulating secure and refined radiometric and paleomagnetic data to correlate the South American faunas and is revising them, particularly the marsupials. He is also involved with the problems of faunal turnover rates.

Above: *Staff paleontologists examine black shale from Mecca, Indiana (1954). Left to right: Rainer Zangerl (now curator emeritus, fossil fishes), William D. Turnbull (curator of fossil mammals), and Eugene S. Richardson (curator of fossil invertebrates).*

Below: *Orville Gilpin, then chief preparator of fossils, now retired, shown in 1957 during reconstruction of* Apatosaurus *skeleton. The specimen is now on view in Hall 38.*

*Paleobotany.* There is presently no curator of fossil plants, and the collection is now under the care of Richardson. The collection, of approximately 71,000 specimens, is particularly strong in Pennsylvanian coal-forest flora of northern Illinois strip mines, Cretaceous and Tertiary floras of the Gulf Coastal Plain of Tennessee, Mississippi, and Alabama, and Early Paleozoic calcareous algae. The only curator of fossil plants in the department's history was George Langford (1947–1961). The collections of vascular plants were largely brought together by Langford and Richardson. At present, the collection of early calcareous algae is expanding as a result of Nitecki's program of collecting in connection with his research.

*Physical Geology.* There are approximately 65,500 specimens in the six physical geology collections. The mineralogy collection contains a wide variety of mineral species and geographic occurrences. The small, but significant gem collection of representative precious and semiprecious stones is mostly on exhibit.

*Bertram G. Woodland, curator of petrology, examining thin section of deformed rock (1963).*

The petrology collection has diverse rocks from all over the world. It is particularly strong in material from Vermont and the Black Hills of South Dakota and there is a large collection of slates and weakly metamorphosed rocks from Pennsylvania, Michigan and Wales reflecting the research interest of Bertram G. Woodland, curator of petrology. Central American volcanic rocks, largely collected by Roy, are well represented. The sedimentary rock section has a reasonably diverse reference collection mainly from the United States, including a significant collection of Lower Tertiary terrestrial rocks from the eastern front of the Rocky Mountains and Utah. A general geology collection has specimens exhibiting geological features (such as raindrop impressions, ripple marks, weathering effects, etc.); a particular strength of this collection is the large representation of concretions and cone-in-cone structures, reflecting another research interest of Woodland.

*Matthew H. Nitecki, curator of fossil invertebrates, with student Robin L. Zawacki (1966).*

One of the largest and most representative meteorite collections in the world is housed at Field Museum. It grew to significant proportions under Farrington, and has been considerably enlarged by Edward Olsen, curator of mineralogy, to nearly 3,000 specimens. Besides the research carried out by Olsen, the collection is a great resource for laboratories all over the world doing research on extraterrestrial materials.

The economic geology collection has examples of most metallic and nonmetallic ores from all over the world. The collection began with the vast number of specimens that were assembled for the World's Columbian Exposition in Chicago in 1893. Further large acquisitions included materials from the Louisiana Purchase Exposition, 1904, The Panama-Pacific International Exposition, 1915, and the Alaska-Yukon-Pacific Exposition, 1909. Significant additions of South American specimens were made by O. Farrington and H. Nichols during the 1920s. In 1962, the E. S. Bastin collection of metallic ores from Canada, Mexico and the western U.S. was transferred to the Museum, including specimens from mines and mining districts that have long been inactive and are now irreplaceable.

An important adjunct to the above is the 2,500 petrographic thin sections of rocks, minerals and meteorites. These reflect the research interests of the staff—particularly igneous and metamorphic rocks and concretions (Woodland), meteorites (Olsen), black shales (Zangerl and Richardson), and terrestrial sedimentary rocks (Clark, now retired).

*To be continued next month*

# OUR ENVIRONMENT

### Sea Turtles Use Salt Marsh As Nursery

Researchers at the University of Georgia have discovered yet another value of salt marshes. They have learned that turtles hatched on the beaches do not head out to sea immediately as previously thought. Instead, the turtles race to the nearest salt marsh which many other marine animals use for nurseries.

This important bit of information was documented with the use of radio-tracking equipment and loggerhead turtle hatchlings.

### Saguaro: the Desert Sponge

The expandable skin of the saguaro cactus can soak up as much as 200 gallons of water during a single desert rainstorm, according to the National Wildlife Federation. Below ground, a network of shallow saguaro roots may sprawl over an area almost 100 feet in diameter. This plant king of U.S. deserts can live for nearly two centuries, weigh almost 10 tons, and grow up to 50 feet high.

### Live, Via Satellite: Wildlife Broadcasts Secrets to Biologists

A loggerhead turtle swims a solitary southwest course in the Gulf of Mexico. Although out of sight of any person, her path is being carefully charted. A polar bear crosses a vast Arctic expanse in search of a suitable den. Hers is the only shadow cast on the frigid wasteland, but each mile that takes her closer to Siberia is being meticulously recorded.

Both the turtle and the bear have been subjects of studies which apply the same communications technology that beam live TV news and entertainment into the public's living rooms. Now, satellites are adding a new dimension to biotelemetry, the study of animals at a distance to record biological information without disrupting normal behavior. But whether satellites or standard radio units are used, telemetry continues to revolutionize wildlife research, yielding invaluable information to improve wildlife management.

Information may be beamed from a polar bear's 10-lb. radio-fitted neck harness or a pine mouse's 1.4-gram, ring-sized transmitter collar: The electronics specialists and wildlife biologists at the Denver Wildlife Research Center (DWRC) tailor transmitting devices for dozens of species, depending on size, life style, habitat, and the type of information needed.

Radio telemetry came of age with the development of transistors in the 1960s and integrated circuitry in the 1970s, providing small parts and increased reliability so that electronic tracking became practical. DWRC, a major research station of the U.S. Fish and Wildlife Service, is a pioneer in this area and works with other federal, state, and private research teams to expand telemetry's capabilities.

Tracking sea animals is a special challenge, since radio signals cannot be carried through salt water. DWRC teamed with the U.S. Department of Commerce's National Marine Fisheries Service (NMFS) to develop ways to track endangered sea turtle species, and in 1978 specialists released baby loggerhead turtles into the Gulf of Mexico with radio transmitters encased in floats tethered to their shells. Trackers hoped the transmitters would signal when the reptiles surfaced for air every few minutes. The experiment proved that telemetry could be a valuable information tool, although limited by small-power transmission to trackers in light aircraft.

To help save any endangered species, scientists must learn long-term behavioral information. Toward this end, the Commerce agency funded a cooperative project with DWRC to track an adult loggerhead turtle by satellite. A 212-lb. turtle was released in October 1979 with a cylindrical float containing a transmitter compatible with a NASA weather satellite system. The turtle's 1,400-mile movements were tracked for eight months, and indicated the big reptile preferred to stay offshore at about 10 fathoms. But, as the researchers were recording the turtle's movements, the satellite beamed the unbelievable: The sea turtle was in Galena, Kansas!

The riddle of the grounded reptile was soon solved. The transmitting device, its tether cut, was traced to a fisherman who had discovered it on a trip to Port Arthur, Texas. The souvenir served as a doorstop and child's toy until its signals led the team to it. However, the fate of the turtle remains unknown.

The Fish and Wildlife Service's electronics experts had been encouraged by their first satellite tracking experiment in 1978, despite one study subject which, unaware of such human conventions as national borders, crossed into the U.S.S.R. With the cooperation of NASA, the Service had begun to study the feasibility of satellite tracking to learn the possible effects of energy exploration on polar bear denning habits. The 400- to 500-lb. female bears seek isolated dens to give birth. The movement of ice in the Far North results in large chunks of ice breaking up, giving the bears shelter to create dens.

Three polar bears were captured and fitted at Point Barrow, Alaska, with transmitters in camouflaged white harnesses built to withstand the severe climate. One bear was tracked for over a year with a satellite that passed 680 miles overhead, receiving intermittent signals and beaming them down to a Fairbanks station which forwarded the data to NASA's Goddard Space Flight Center in Maryland. Researchers charted the bear's westward progress past Wrangel Island off the coast of Siberia to her eventual denning location in the west Siberian Sea, a total of more than 1,000 air miles. Her long odyssey surprised Service researchers and disproved the theory that Point Barrow and Wrangel Island bears belonged to separate colonies.

While many uses may be envisioned for satellite tracking, it must be limited to large animals that can carry the required equipment, and to cost-effective studies where there is no other practical means of getting long-term information. Meanwhile, uses for standard telemetry appear almost unlimited. A simple transmitter that can report an animal's movements to a field researcher equipped with a receiving unit may provide information to help resolve pressing wildlife-related problems. Such transmitters on vampire bats in Latin America enabled biologists to discover that the biting, blood-lapping carriers of rabies lived in colonies in certain caves, apart from other, harmless bat species. By the mid-1970s, selective controls could be applied to keep the vampire in check, protecting humans and saving millions of dollars in livestock losses.

Federally protected species like the loggerhead turtle and the polar bear are often subjects for telemetry studies. These studies yield data on such topics as seasonal movements, which are invaluable to scientists who must make recommendations that are used to manage populations. Service researchers use transmitters on endangered Florida manatees that congregate around warmwater springs in the winter to see where these elusive, otherwise solitary creatures go when spring arrives. Transmitters have also been used to study movements of the endangered shortnose sturgeon in the Altamaha River in Georgia. Service fishery researchers have even developed tiny transmitters that are ingested by salmon. The resulting information is being used to help restore depleted salmon runs on both coasts.

As the number of species under study

*Continued on p. 25*

*The Sphinx, carved largely from a natural outcropping of rock and in the likeness of a great pharoah, stands guardian over three pyramids. A vast necropolis, or village of the dead, surrounds the pyramids with hundreds of tombs and buried ritual objects such as funerary boats.*

*Learning Museum Program continues with*

# ANCIENT EGYPT: MUMMIES, MAGIC, AND LOVE

By ANTHONY PFEIFFER
*Project Coordinator*

Made possible by a grant from the National Endowment for the Humanities, a federal agency.

## OZYMANDIAS

Percy Bysshe Shelley

(1792-1822)

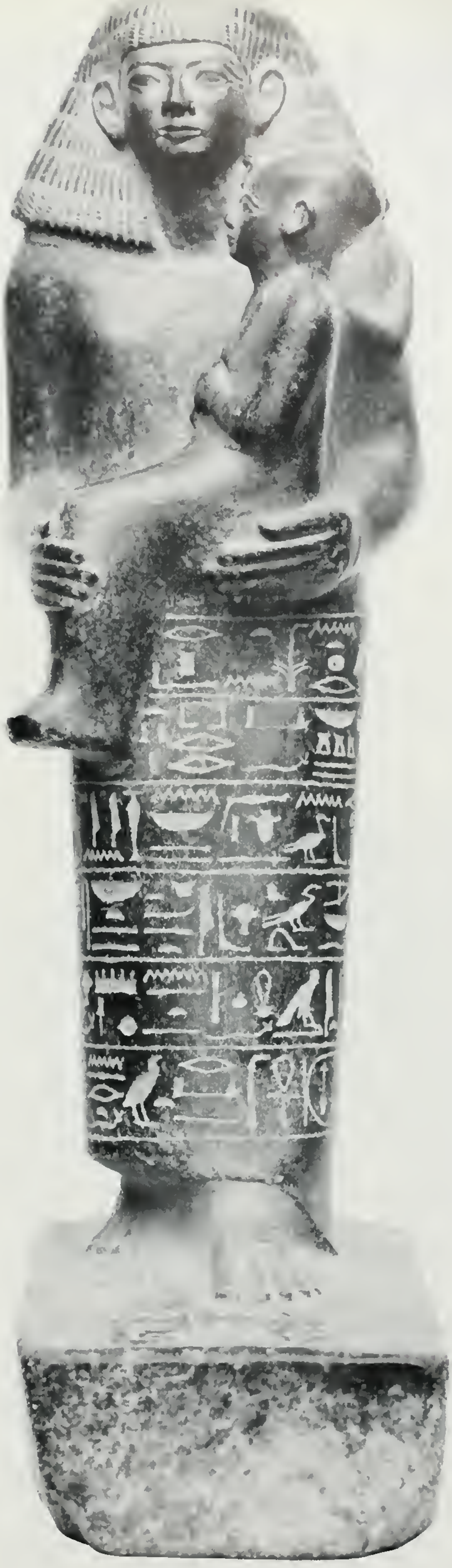
*I met a traveller from an antique land,*
*Who said: Two vast and trunkless legs of stone*
*Stand in the desert. Near them, on the sand,*
*Half sunk, a shattered visage lies, whose frown*
*And wrinkled lip and sneer of cold command,*
*Tell that its sculptor well those passions read,*
*Which yet survive, stamped on these lifeless things,*
*The hand that mocked them, and the heart that fed:*
*And on the pedestal these words appear:*
*"My name is Ozymandias, King of Kings:*
*Look on my works, ye Mighty, and despair!"*
*Nothing beside remains. Round the decay*
*Of that colossal wreck, boundless and bare*
*The lone and level sands stretch far away.*

SHELLEY NEVER SAW THE COLLAPSED STATUE about which he wrote so eloquently. His vivid imagery seems to have been inspired by a Greek description of the magnificent and isolated sculpture which was built during Egypt's 19th Dynasty (1293-1184 B.C.). The obscure Greek text, immortalized by a great poet, stands as testament to the awe in which Egyptian civilization has been held for thousands of years—"Look on my works, ye Mighty, and despair!"

An unbroken record of wonder at ancient Egypt traces back to the first stirrings of western civilization and continues unabated today. Worship of Egyptian gods spread throughout the Roman Empire, as far away as the northernmost reaches of England. Everything Egyptian—the language, intricate and massive works of stone, ornate ritual, and idols in animal form—filled the classical world with peculiar fascination. Recent decades of popular Hollywood mummy movies and the spectacular success of the Tutankhamun exhibition demonstrate the compelling and lingering mystique of the long-dead pharaohs.

More than five thousand years ago, the ancient Egyptians proclaimed the resurrection of a spiritual body and the immortality of the soul. A remarkable document, *The Papyrus of Ani* (the best-preserved copy of the *Egyptian Book of the Dead)*, shows that mortal existence was viewed as a transition to immortality in the heavens. These beliefs were not just idle talk. A monumental architecture evolved in service to the beliefs, as did elaborate preservation of dead bodies and careful provisions for the soul of the deceased. Were it not for creations inspired by belief in the afterlife, the Egypt of the pharaohs would be dead to us. Most works through which ancient Egypt is known were preserved within tombs in villages for the dead.

Skilled tomb construction, master craftsmanship of mortuary objects, mummification taken to a fine art, and nature's gift of a dry climate have combined to preserve all that had to do with death. Death pervades the images we have of Egyp-



*One of the best of its kind, this black granite statuette shows Senmut, who had an ambiguous relationship with Queen Hatshepsut (18th Dynasty). Senmut is shown holding Neferure, the queen's daughter, whom he was chosen to educate.*

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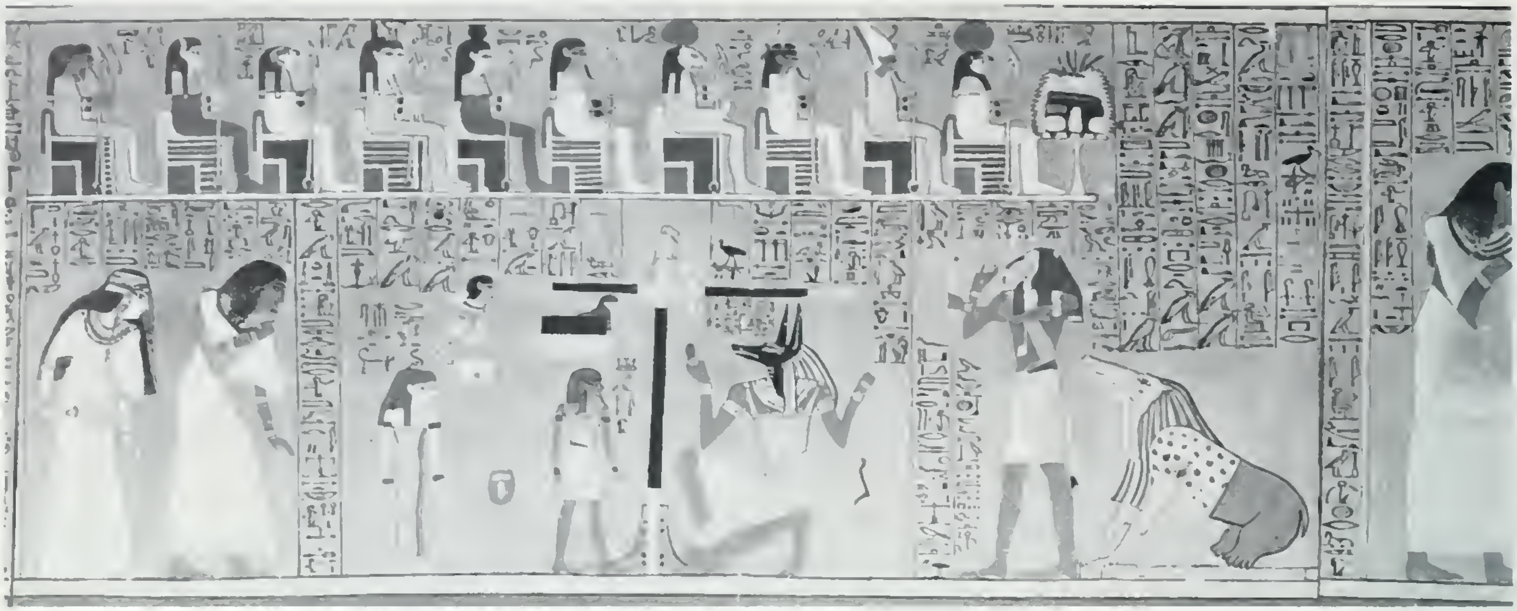
**NEH Learning Museum at Field Museum**

The NEH Learning Museum program is a three-year sequence of learning opportunities focused on the Museum's outstanding exhibits and collections and designed to give participants an opportunity to explore a subject in depth. Each unit of study consists of one or more special events, a lecture course, and a seminar for advanced work. Special events are lectures by renowned authorities or interpretive performances and demonstrations. Course members receive an annotated bibliography, a specially developed guide to pertinent museum exhibits, study notes for related special events, and access to select materials from Field Museum's excellent research library. In-depth, small group seminars allow more direct contact with faculty and Museum collections.



*A facsimile segment of the legendary papyrus of Ani (18th dynasty) Moving left to right, Ani, followed by his wife, is just beginning his passage to the afterlife and faces his final judgement. If his heart, representing his conscience, balances against a feather, symbolizing law, he enters heaven. Anubis, god of the dead, operates the scales. The god of wisdom stands ready to record the verdict. If Ani fails to be worthy of immortality, the half-crocodile, half-hippopotamus monster eats him and he dies a second death.*

tian civilization. The morbid specter of a mummy's curse and the desiccated visage of the walking mummy itself haunt popular consciousness. In startling counterpoint to these dreadful imaginings, the evidence for Egyptian zest for living is ample. They liked good food and drink. In love they ranged from lustful and bawdy to romantically idyllic and tender.

The fabulous accomplishments of ancient Egypt were clearly not those of a people preoccupied with death. Roughly 3,000 years before Christ, in what must have been a dramatic conflict, Upper and Lower Egypt were united and the foundation for 25 centuries of dynastic rulers was laid. These regions of Egypt never lost their distinctiveness, and a dynamic tension between them is a thread running throughout Egyptian history. Many of the objects from the tomb of Tutankhamun bear symbols of the unification of the two lands, the papyrus plant of Lower Egypt and the lotus of Upper Egypt tied together at their centers, for example.

*Beautifully modeled bronze casting of cat, larger than life-size, sacred to the ancient Egyptian goddess Bast. Gift of Watson F. Blair (1895). On view in Hall J, case 16.*

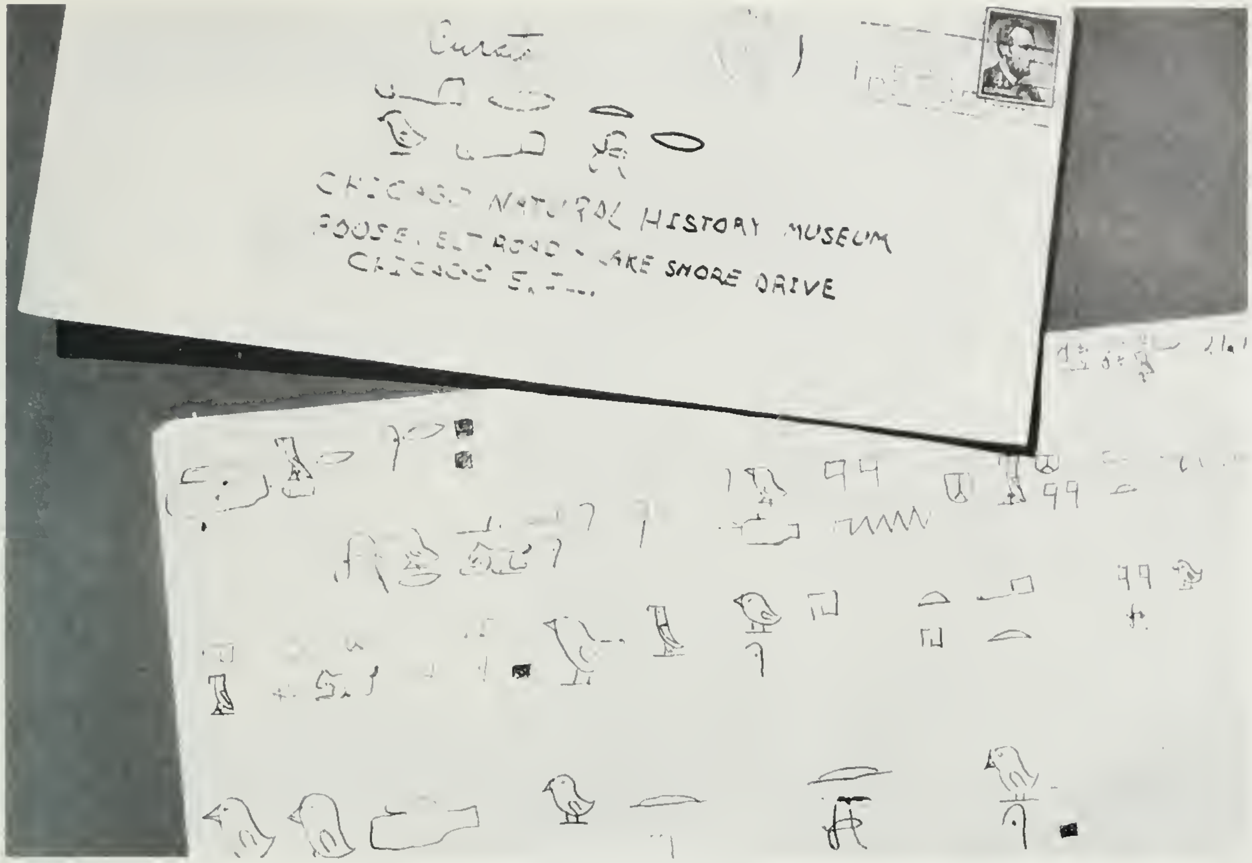
Once united, Egyptians tamed the Nile. Egyptologists wince when the oft-cited words of Herodotus, "the father of history" (400 B.C.), are quoted once again. But his words put the point succinctly: "Egypt is the gift of the Nile." Napoleon Bonaparte's observation was more sophisticated:

> *There is no country in the world where the government controls more closely, by means of the Nile, the life of the people. Under a good administration the Nile gains on the desert; under a bad one, the desert gains on the Nile.*

An untamed Nile was capricious and unreliable. Usually its floods would deposit fertile soil, nurturing some of the world's earliest and most prolific agriculture. But when too high, the Nile would rage over the land, destroying the work of months in a few moments. When Egypt was united, however, cooperative projects led to more control of the river throughout the land.

A harnessed Nile and the centralized power of kings, in turn, gave rise to advanced concepts in writing, science, and art. Even in the late period when dominated by foreigners, Egypt seemed a special place for intellectual and aesthetic productivity. Under the Greeks, for example, Alexandria became the commercial capital of the world and the center for scholarship. The Alexandrian museum with its great library produced the mathematicians Archimedes and Euclid, the astronomers Hipparchus and Ptolemy, the physicians Erasistratus and Herophilus. Many of our modern ways of conducting science, tenets of religion, artistic sensibilities, and attitudes in daily life trace back to ancient Egypt before the Greeks.

Ancient Egypt: Mummies, Magic, and Love invites you to explore the most fabled civilization the world has ever known. Field Museum brings you speakers from the University of Pennsylvania, the Museum of Fine Arts in Boston, the Oriental Institute at the University of Chicago, and Roosevelt University.



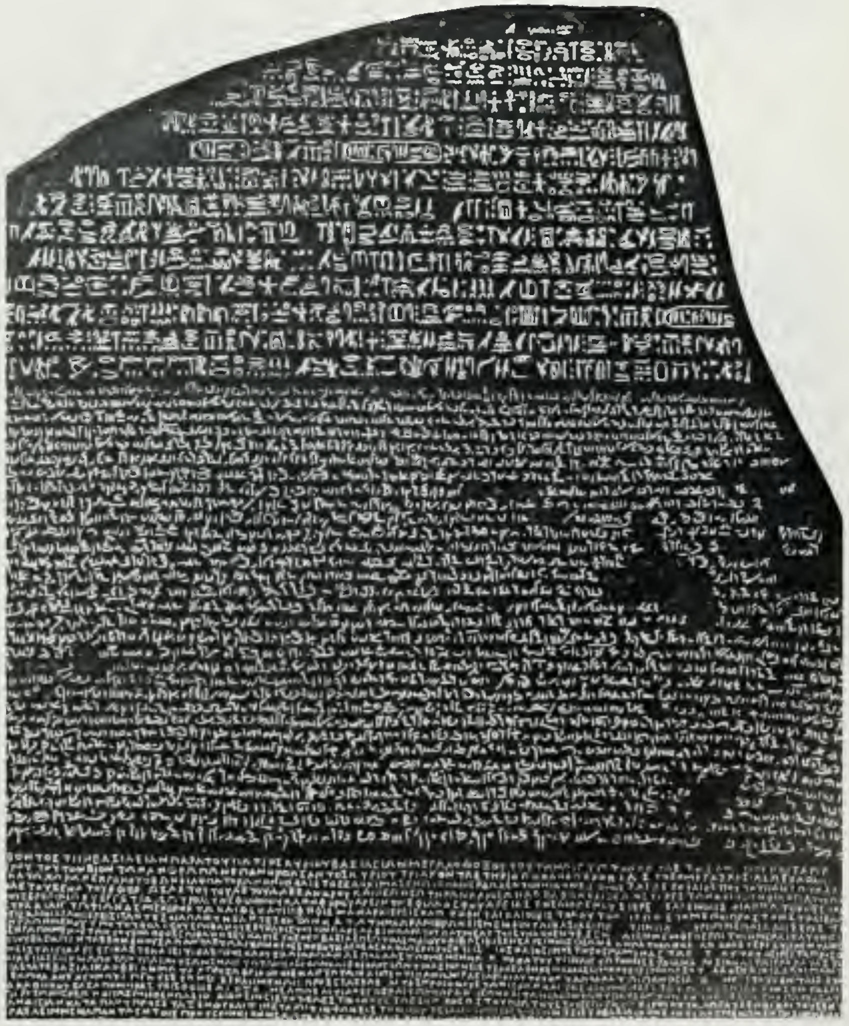
Curator

CHICAGO NATURAL HISTORY MUSEUM
ROOSEVELT ROAD - LAKE SHORE DRIVE
CHICAGO 5, ILL.

*At right is a facsimile of the Rosetta Stone. This modest piece of rock held the key to breaking the hieroglyphic code. The letter shown above is indicative of the fascination hieroglyphs evoke. Sent by three 6th graders at Churchville Elementary School in Elmhurst, Illinois, to Field Museum, it reads, "Dear Sir, Our class is studying Egyptian hieroglyphics. Wish that you would write to us. Yours truly . . . ."*

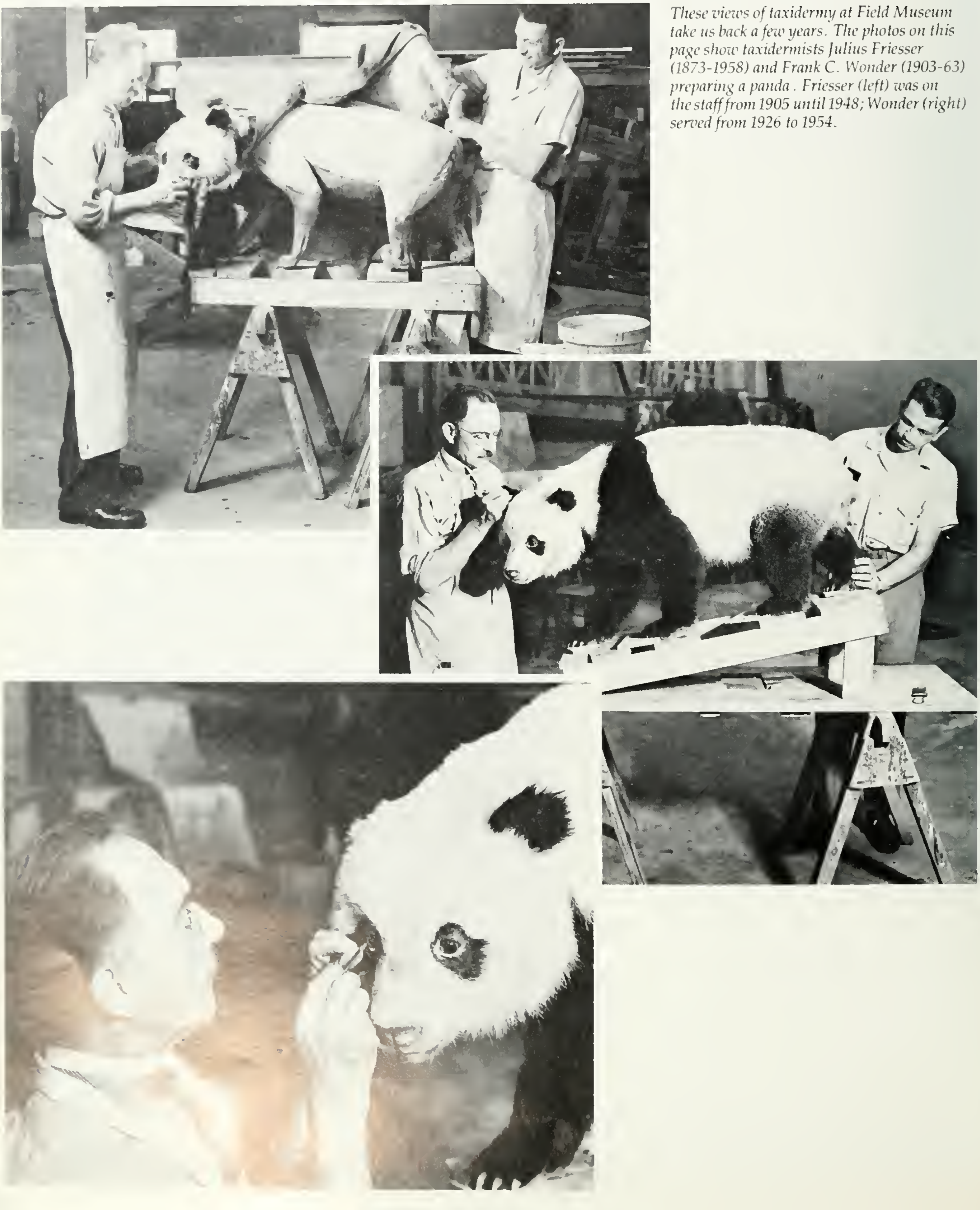
Learn about mummification as a tribute to the immortality of the soul and how elaborate funerary cults reflected beliefs in cycles of death and rebirth. Made to be visited and destined to be robbed, tombs are seen in a practical light. Their purposes and how they were acquired and paid for are revealed. Curses and love charms are seen to have a basis in magic and religion. Reading and writing are contrasted with other ways of climbing the social ladder in class-conscious ancient Egypt. See how love of life was celebrated in care of the land, through imposing structures, in song and in the rare surviving pieces of literature. The course of study begins on April 16, and details are highlighted in the Spring, 1981, *Courses For Adults* Brochure.

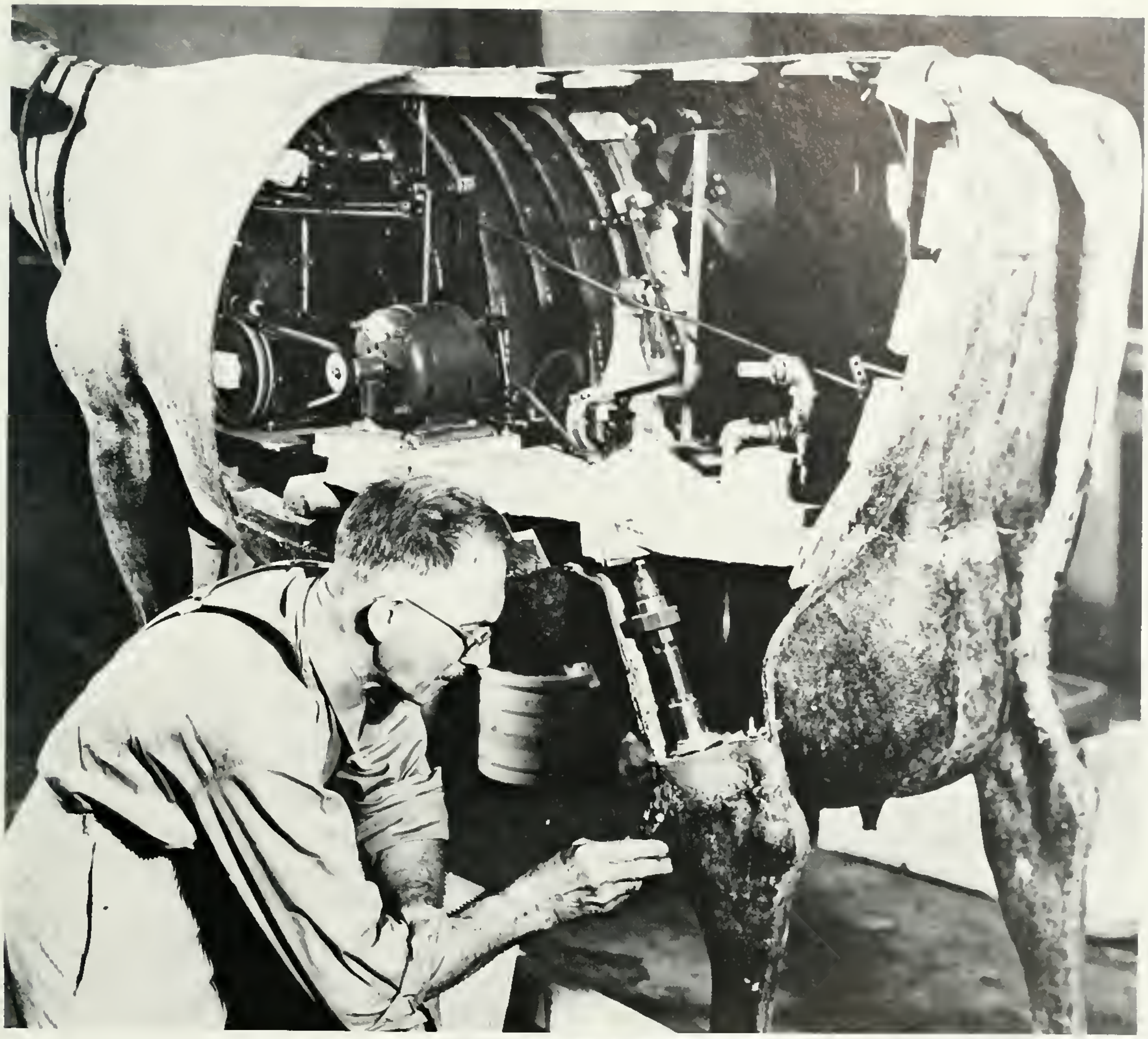
You are also invited to an all-day film festival on Sunday, April 26. The festival, "Images of Egypt, Past and Present," offers Hollywood, popular scientific, ethnographic, and scholarly cinematic perspectives. *The Awakening, The Night of the Counting of the Years*, and a Nova program on the modern rediscovery of hieroglyphic meanings are among the featured films. Brief panel discussions with Egyptologists are included. See the *April Calendar of Events* for details.



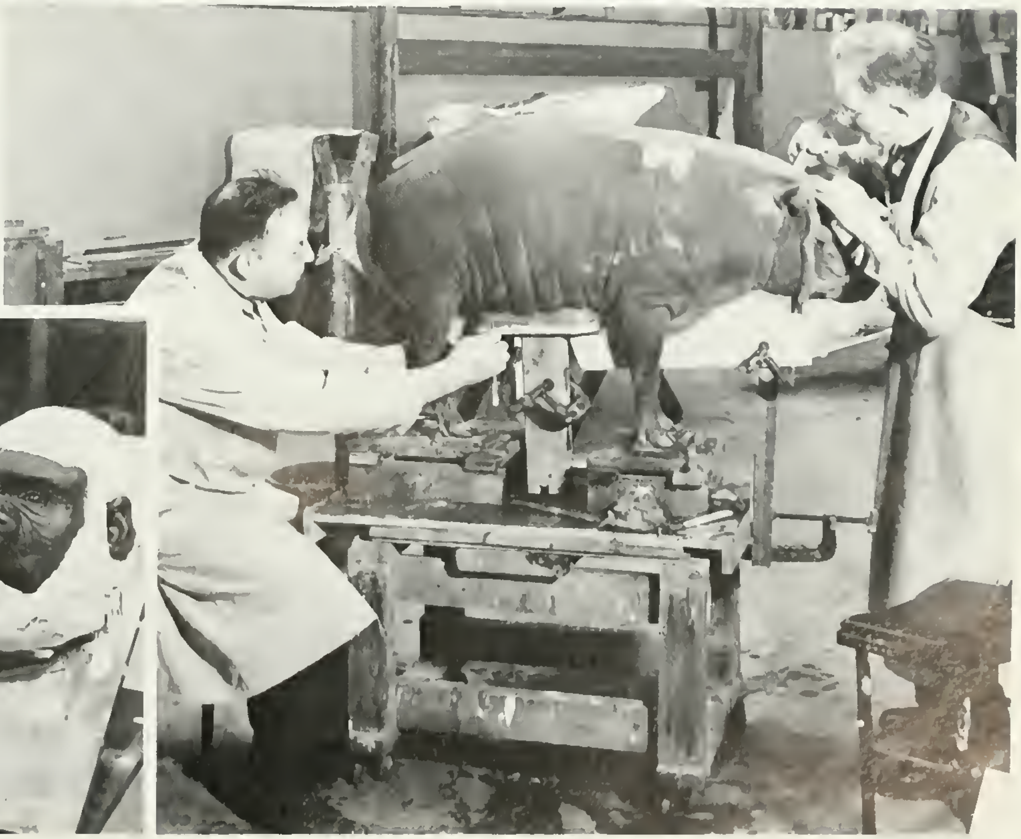
# BEHIND THE SCENES

*These views of taxidermy at Field Museum take us back a few years. The photos on this page show taxidermists Julius Friesser (1873-1958) and Frank C. Wonder (1903-63) preparing a panda . Friesser (left) was on the staff from 1905 until 1948; Wonder (right) served from 1926 to 1954.*





**Above:** *Julius Friesser works on mechanical cow that subsequently was displayed at Chicago's Museum of Science and Industry.* **Right:** *Friesser (right) and Leon Walters (1888-1956) are well along on their preparation of a babirusa, on view today in Hall 15. Walters served on the staff from 1911 to 1954.* **Below:** *Walters works on Bushman (1952), the celebrated gorilla now in Hall 3.*



# KIMBERLEY SNAIL HUNT, AGAIN!

*Text and Photos By* ALAN SOLEM
*Curator of Invertebrates*

SINCE EARLY 1974 I have been involved in continually expanding studies on land snails from Western Australia and parts of the Northern Territory. A series of field and study trips to Australia—January to March 1974, September 1976 through June 1977, May to July 1979, and April to July 1980—have yielded about 93,000 specimens in 4,141 lots from 724 collecting stations. Early articles in the *Bulletin* (July/August 1976, March 1977, and October 1977) detailed some aspects of field work. In April 1979 I summarized the complex aftermath of producing technical articles on the material collected.

To date I have submitted three large and one small paper based both on these collections and on additional materials in Australian museums. These papers total almost 700 pages of manuscript and are being published in Western Australia. The main thrust of my research is in revising the camaenid land snails, a group which invaded Australia from Southeast Asia probably during the Miocene (about 20 million years ago). According to the theory of plate tectonics, the Australian plate collided then with the Southeast Asian plate, providing a set of island steppingstones for the exchange of organisms in both directions. About one-third of the more than 200 camaenid land snail species are now published in Parts I–III of "Camaenid land snails from Western and central Australia (Mollusca: Pulmonata: Camaenidae)" issued December 1979 (Part I) and March 1981 (Parts II and III) as *Supplements* to the *Records of the Western Australian Museum*, Perth. Another third of the species are in manuscripts being edited for submission, and the remaining third are in various stages of study.

As work progressed, it became obvious that I lacked adequate material from certain critical areas, and a continual stream of new questions arose. With the support of a new grant from the National Science Foundation, Field Museum of Natural History budget, and funds donated by Mrs. Arthur T. Moulding, Mr. H. Wallace Roberts, and the Chicago Shell Club, it has been possible to undertake additional field work in both 1979 and 1980, and to seek the answer to a variety of new questions.

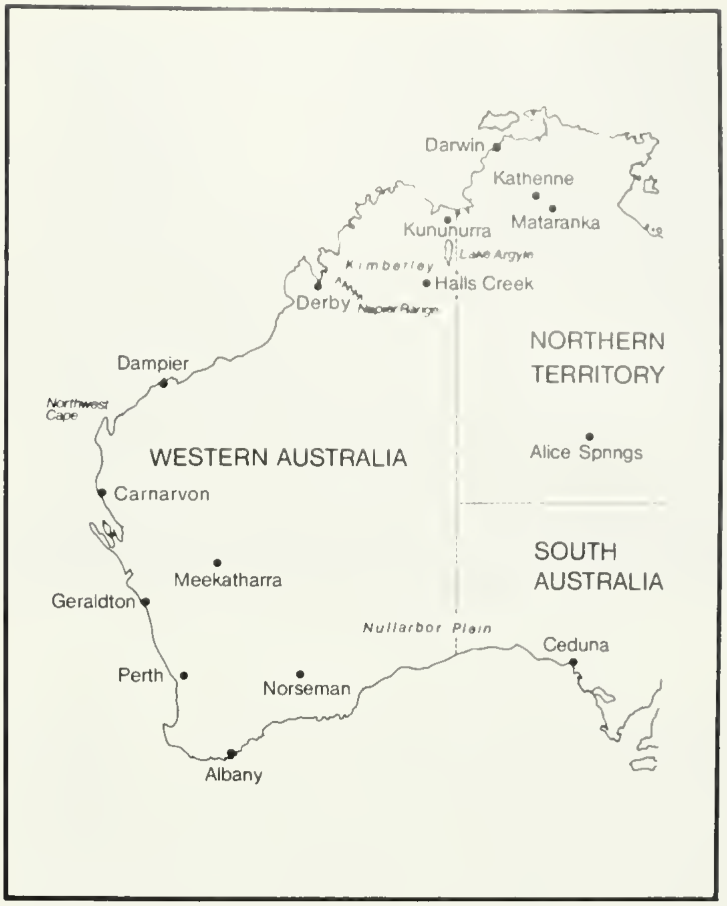
The first added effort involved a short period of field work along the south coast of Australia. The camaenid land snails never reached the very moist southwest tip of Australia

A Field Museum [illegible]

extending a few hundred kilometers both north and east of Perth, but dead shells and a few live examples of several camaenids had been taken at a number of places between Norseman, Western Australia, and Ceduna, several hundred kilometers into South Australia on the fringes of the Nullarbor Plain. Apparently related species live in the mountain ranges near Alice Springs, Northern Territory. Collecting efforts near Alice Springs by myself in 1974 and 1977, then by Fred and Jan Aslin of Mt. Gambier, South Australia, in 1978, had provided major collections from the Alice Springs region for study, but the lack of anatomical material from the south coast was a major gap in geographic coverage.

My previous field work in the Australian outback had taught me that although snails are very easy to collect in the wet season, when they are out and crawling, often these conditions mean that the area to be visited cannot be reached by vehicle, foot, or even horseback. Heavy rains turn the bush tracks into impassable quagmires. The lesson of a Western Australian Museum field vehicle mired in November and dug out in May makes me hesitate to challenge the rains. Good collecting also can be done at the start of the dry season by cropping snails that have aestivated in shallow rock piles before the annual bush fires fry them in their shells. The more deeply hidden snails in the same rock piles are insulated from fire by the depth of rock and from collectors by the weight and volume of rock to be moved. Other snails spend the dry season in deep fissures of boulders or cliffs and are not accessible to the collector.

But collecting of material to dissect was not my only interest. I've been working out the basic seasonal reproductive cycle in camaenids from the Kimberley, where heavy summer rains (November to March) are the rule. No rains fall in the remaining months (April to October). Along the south coast, winter rains (May to September) are the pattern, with occasional showers falling out of season. Would the south coast snail species show a reversed reproductive cycle? The same reproductive cycle? There was only one way to find out. Go there at a critical point in the hypothesized annual cycle: right at the start of the rainy season. I would try to get into the area just before the rains came, or just at the time of first rains, but before the roads became impassable. A very neat balancing act, since a misjudgement could result in being stuck for days or even a few weeks.



I left Chicago early in May 1979, just as a touch of spring was in the air. Arrival in Perth was just as the first clouds of the approaching rains gathered and the chill of fall began. I was joined there by Fred and Jan Aslin, dedicated snail collectors and geological technicians with a great knowledge of caves and the Australian bush. We headed east from Perth, into the first pouring rains. From Norseman, we went out to nearby Jimberlana Hill. In February 1974 (midsummer dry season), Laurie Price, Field Museum field associate in zoology from Kaitaia, New Zealand, and I had spent half a day to get a few broken shell fragments. On this same slope in June 1979, we got over 60 live adult snails in a couple of hours.

This auspicious beginning marked an incredible three weeks of luck with the weather. Rains either just preceded us or accompanied us. They were hard enough to activate the snails, but not so heavy as to wash out the roads. Fred Aslin delightedly map-read our way across country from sinkhole to cave to limestone ridge (all places that provide good shelter for the snails we sought). Days passed and the collecting bags filled. Nights grew colder—several mornings ice was on the tents. Days grew shorter, and the rains more frequent as the Australian winter closed in . The field work ended, and, on returning to Perth, I found that galley proof for Part II of my monograph was ready to read. There was a frantic rush to pack gear and specimens, read galley proof, then undertake needed studies of specimens at museums in eastern Australia and New Zealand. After returning to Chicago, unpacking and processing of the specimens took a few weeks, then I made a quick check to see if there were any dramatic surprises in the collections. Some minute land snails belonging to the family Punctidae were selected and shipped off to a New Zealand colleague for study, and I then returned to analysis of the Kimberley snails.

Finished manuscript awaiting publication in Perth covered 75 species. By late 1979, another 60 species were "roughed out"—I was reasonably certain what were species, had analyzed local and geographic variations, and had dissected many individuals of each species. My very talented new illustrator, Linnea Lahlum, was busily translating the three dimensions of anatomical structure into lines and dots on paper. Many of these species live in the series of Devonian age limestone reefs that fringe the Kimberley on the south and east. These raised relicts of a long-vanished shallow sea have today an extraordinary radiation of camaenid land snails.

The great majority of these species are new to science. We realized we had many new species when we were collecting them in 1976 and 1977, but not *how many*. We could not "field identify" each of the more than 100 new species. We tried to make fully adequate collections, but inevitably as I studied the material, there would be a gap of a few hundred meters between collecting stations. Naturally, interesting things happened in these gaps. "Species A" was found on one side of the gap, "Species B" on the other. Did they overlap? Intergrade with each other? Sharply replace each other? Show major changes in shell and/or anatomy within this area? Such questions increasingly are a part of modern systematic revisions. Aspects of both camaenid distribution and biology made these species an excellent group to pursue such questions in the field.

Also, for many species from the east fringes of the Kimberley, all I had available were dead shells. My only collections there had been made late in the dry season, after the annual fires, and thus the most difficult time to collect live snails. They obviously represented unknown species, but without soft parts to study I could not hope to show exactly how they were related to other species and genera. Finally, an amateur collector had just (March 1979) found some very intriguing camaenid land snails near Katherine, Northern Territory. No collections of land snails had been made anywhere between [illegible] and the East Kimberley. Once again [illegible] significant collecting gap.

[illegible] supplemental funding for field work [illegible] from the National Science Foundation [illegible] given. Another generous donation by Mrs. Arthur T. Moulding provided the added financing needed for a return to the Kimberley, and, together with a donation from H. Wallace Roberts, to extend the field work into the unvisited areas between the East Kimberley and Katherine, Northern Territory, then along the Western Australia-Northern Territory border between Kununurra and Halls Creek.

With financing arranged, a flurry of letters and calls was needed to assemble a field team. Mr. Laurie Price, who had been with me in 1974 and part of 1976-7, indicated that since his father, now in his mid-80s, still was loading and unloading hayracks by himself, on their beef feeder farm in northern New Zealand, he could get away for 2½ months. He would join me in Perth for the long drive north and the subsequent weeks of collecting. Jan and Fred Aslin, from Mt. Gambier, South Australia, elected to use three weeks of holiday time to join us for the collecting in the Northern Territory and far northern corner of Western Australia. They would fly into Kununurra and then return home from Katherine. Barbara Duckworth, assistant at the Australian Museum, would fly to Katherine shortly after the Aslins left, providing a much needed extra pair of snail-snatching hands as we worked our way back to Perth.

By the end of April everything was ready for our departure from Perth. As usual, Fred E. Wells, curator of molluscs at the Western Australian Museum, Perth, and Kevin Young, storesman, had everything so well organized that all Laurie Price and I had to do was buy food and pack the landrover for 68 days of camping. We departed on a bright sunny morning with a well-stuffed landrover. A midmorning pause revealed a low hum and strange vibration near

*Bush flies, which greeted us every morning, find Laurie Price's hat irresistible.*

the right rear of the landrover that persisted even when the engine was turned off. Puzzled and more than a little concerned, I felt extremely foolish on finding that my battery-powered electric razor had accidentally turned on and was merrily running down—oh, well, the change from partial to full beard would not be difficult.

Our first night out was a camp near some rocks with a warm breeze, near full moon, brilliant stars, and a chance to organize our vehicle packing more efficiently. The second and third nights out produced evidence of the unusual wet season that had just ended: clouds of voracious mosquitos, the worst I've encountered anywhere. A part of the coast that normally has 10 inches of rain in a year had been soaked with 42 inches in January alone. The mosquitos were a residual reminder of this abundant deluge. Laurie Price and I disagree completely on how to camp out—I prefer a zipped-up tent in areas where mosquitos, snakes, spiders, scorpions, and ants are common; he always opts for a sleeping bag in the open or at most a tarpaulin against the rain. I admit to smiling smugly as I drifted off to sleep in my mosquito-free tent (after swatting 10 or 15 invaders), listening to grunts, expletives, and smacks as Laurie continued to deal with his constant visitors.

We drove past Derby on the fourth day and headed east to the Napier Range, the southern and eastern edge of the Kimberley snail country. Although it is less than 100 miles inland from the area drenched by January downpours, the Napiers had suffered two bad wet seasons in a row, receiving less than half their normal rainfall. Waterholes that had been usable by cattle in late November 1976 were almost empty in early May 1980 and had dried out completely by late June 1980. The two years of drought had drastic effects on the snail populations. Rock slides that had yielded live materials in abundance in earlier visits now contained almost no live individuals.

Collecting of live specimens was very poor, but we could use dead shells fairly effectively to trace out exact points of some species transitions. And we did have success with an experiment in marking snails. In January 1977, 122 live adults of one species had the top of their shell marked with bright pink nail polish, then were returned to the population. Now, 44 months later, even though most live snails were aestivating deep in cliff fissures, we found two live and only three dead marked shells. Since this species takes three years to mature, we now know they can live at least seven years.

We traveled east to the Oscar Ranges, Virgin Hills, Pillara Ranges, and Emanuel Ranges, each area showing clear signs of drought. At Halls Creek, we then turned north to Kununurra and returned to an area blessed with good rainfall in 1979–1980. At the Kimberley Research Station, they had had a normal 46-inch "wet season." We picked up Fred and Jan Aslin at the Kununurra airport, and headed out to an obscure chain of hills that was our prime objective for collecting. Luck came our way in full measure.

In 1976 and 1977, gaining access to these hills involved much 4-wheel-drive grinding away. At times, the track dwindled to a barely detectable trace. Exploration for both minerals and oil is taking place all over Australia, and the area we hoped to collect in also was scheduled for 1980 geological surveys. We thus found a newly graded "superhighway" into the range. On pulling up at our potential campsite, we were greeted by a genial red-bearded giant—naturally nicknamed "Tiny"—who not only cleared a

*Above: Main access road in 1977. Below: 1980 "superhighway" amid cane grass.*

campsite for us with his grader, but announced that in the next two days he would be clearing the track all the way to the top of the hills. Instead of creeping along the track trace at 5–10 km/hour, we could breeze along a "highway" at 40–50 km/hour—so long as we stayed on the track. In places the cane grass was 12 feet high, and routinely we would drive through 3–5 foot dense grasses, capable of hiding 6-inch to 3-foot old reef edges, that could badly batter our landrover. Boggy spots could be spotted only with difficulty, and off-track travel had to be slow and cautious.

Once off the track, there are no trails, only a confusing tangled web of kangaroo hops, crossing and recrossing, joining and separating. Hiking to the raised limestone ridges was easy. One can pick a promontory, and despite detouring around raised reef edges or weaving through boulder fields, making use of first this and then that kangaroo pathway, glimpses of the promontory keep you approximately on track. Returning *from* the ridges was far more difficult. Only at rare places along the chain was there a clear landmark to the east that could be used for return navigation. Embarrassingly often I would join the main track many meters from the parked landrover.

*Limestone cliff typical of the Kimberley*

In two frantic weeks, we made 83 collecting stations along this 42-kilometer discontinuous chain of hills. We were attempting to establish exactly where transitions occurred among species and what the total range of each species was to the nearest 100 meters. My initial collecting in 1976 and 1977 had resulted in finding 17 species from 17 stations. In only three cases did two species occur under the same rock, and in only three situations did the same species occur at two different stations. We could now field identify our collections, and by moving back and forth along the hills, could quickly tell where species changed over. It will take months of detailed study to verify our field impressions, but this short area of limestone seems to have the greatest concentration of speciation among land snails known for any area in the world, and may be a record for any group of organisms. We now know 21 species from this region, with only 8 situations in which "same rock pile" occurrence of two species can be demonstrated. The total range for each of these species is 0.3–4.9 km, with a median range of 1.6 km. How this evolved and how this diversity is maintained are questions yet to be answered.

At the mining company headquarters, we had seen large scale aerial photographs of this region, indicating that large, isolated areas of limestone lay 2–4 km east of the track. Hiking into and back out from one of these masses took all day, but another two new species were collected. The other areas were thoroughly shielded from ready visitation by boulder fields and reef edges.

In the last few years, the use of helicopters to muster cattle has become standard in much of the Kimberley. I thus tried, without success, to rent use of a helicopter to reach the most isolated area. Alas, this miracle of modern machinery broke down three days running, frustrating our attempts. Members of the Chicago Shell Club had donated $200 toward my field work, with the request that this be used for an exceptional opportunity. Thus, at the end of our field work, we chartered a single-engine prop plane, and spent 90 minutes traversing along the range photographing madly, and noticing all kinds of interesting isolated rocks or pinnacles that were potential homes to additional unusual land snails. But these were not to be reached on this trip.

Delighted with our collecting and our viewing, we headed east to Katherine in the Northern Territory. Greatly aided by rangers of the Territory Parks and Wildlife Commission, we sampled the scattered exposed limestone outcrops near Katherine and Mataranka, south of Darwin and in the center of cattle country.

Farewell to the Aslins, hello to Barbara Duckworth at Katherine, and then back into Western Australia after land snails near the shores of Lake Argyle. We met with considerable success, and then headed south and east to a different area of the Napier Range west of Derby. Live specimens were very scarce because of the two bad wet seasons, but we did manage to collect live specimens of the last two Napier Range species for which I lacked anatomical material for dissection.

In sunny, warm weather, slightly cool nights, and elated with success, we headed toward Perth, nearly 3,000 km to the south. We had been without news of the world, except for an occasional *Time* or *Newsweek*, for two months. All of a sudden there was a barrier across the road, indicating that it was closed to traffic. Enquiries were made at Dampier. The worst rains in over 30 years had flooded the coastal roads 400–1,200 km south of us. They were expected to remain closed for several weeks. This was exactly the area targeted for one final field effort—to resample several populations visited on earlier trips and thus to complete a "sampling through the seasons" with collections spaced at roughly two-month intervals. This project was, literally, a washout. If the main roads were closed for four or five weeks, the side tracks would be impassable indefinitely.

Fortunately, we could take an inland road through Meekatharra down to Perth, splashing through puddles and miniature lakes, and entering Perth in the middle of a 2½-inch thunderstorm. There awaited galley proof for Part III, plus the now-routine packing of specimens for shipment, cleaning and repair of field gear, and planning for the next stage of work in Chicago.

Arrangements for the six cartons and crates of specimens, 18,000 in number, to be shipped air freight were completed, and I returned to Chicago in late July. The shipment did not arrive when expected, and early in August I started to track it down. Five crates had reached San Francisco. The sixth was missing. Which one was lost? Naturally the one containing the scientifically most valuable material: the specimens for dissection from the area of remarkable diversity in which we had labored so hard. After a nail-biting week, we learned the crate was found, but badly damaged, in Sydney. At long last, after salvage efforts by colleagues at the Australian Museum, it arrived, with ⅛ to ¼ of the specimens damaged, but the vast majority intact.

*Pocket of live snails*

All 731 lots and 18,000 specimens from the 1980 trip have been sorted, housed, given preliminary identifications, cataloged, and readied for study in detail. But already I can see a big geographic collecting gap in the Northern Territory between Alice Springs and Mt. Isa in Queensland. Aerial photographs and our 90-minute flight over the limestone hills that contain the 21 species collected to date show major isolated areas of limestone that we could not reach cross-country—certain to contain other species. Problems of species interactions in this area offer great opportunities for study. And the final sampling of snails between the Northwest Cape and Geraldton still needs to be made.

The joy of scientific research. Partly answer one question, reveal a dozen others. Learn a bit, question a lot. Improve the quality of the questions asked. A continuous and enjoyable process on which I'm well along. ☐

*Shells, labelled and cataloged, await laboratory study*

# FIELD MUSEUM TOURS

## Papua New Guinea

May 1-17
Tour Price: $4,461

Papua New Guinea is unique on the face of the planet Earth. For millenia (or untold time)a diversity of contrasting cultures has flourished here within small areas because of the isolation imposed by rugged terrain of mountains and jungles, and because of hostilities between the many different peoples. Largely unknown to each other and to the outside world they coexisted, each in a communal environment sufficient unto itself. Only since contact with modern industrial society has this isolation been broken, making it possible for visitors to explore and exclaim over the natural wonders of this Edenlike paradise.

It is one of the most remarkable—and last—reservoirs of animal, reptile, insect, and bird life to be found anywhere. But most of all, Papua New Guinea presents a variety of cultures and art of such freshness and color it holds a fascination beyond all else.

The Sepik River is a monster waterway draining a vast area of grassland, swamp, and jungle in its serpentine circuit. We will cruise the Sepik, reaching into the past in remote regions where the villagers still travel in traditional dugout canoes.

Our lecturer, Dr. Phillip Lewis, curator, primitive art and Melanesian ethnology, will escort the tour from Chicago, and share his knowledge of the varied arts and cultures of Melanesia. In addition, our Sepik director, Jeff Leversidge, a well-known personality on the Sepik and Ramu Rivers, and very knowledgeable about the diverse cultures, arts, and customs of the Sepik regions, will lecture the group during the cruise and shore excursions.

Accommodations on board the newly refurbished *Melanesian Explorer* are modern and comfortable. Passengers are housed in air-conditioned twin-bunked cabins, each with private bath.

## Kenya and the Seychelles

September 12-October 3
Tour price: $3,750

There Is Now, as there has always been, an aura of mystery surrounding Africa—Tropical islands and the coast, endless palm-fringed beaches, snow-capped mountains on the equator, jungle primeval, sun-baked plains. They are all a part of East Africa. The wildlife—the [illegible] processions of elephant and giraffe, [illegible] the beautiful and rare leopard, the elegant cheetah, [illegible] wildebeeste and zebra. Only here in East Africa is there still such diversity.

The itinerary includes a daytime stopover in London, overnights at the Nairobi Hilton, Mt. Lodge Tree Hotel, Samburu Game Lodge, Mt. Kenya Safari Club, Lake Hotel (at Lake Naivasha), Governor's Camp (Masai Mara Game Reserve), and other first class accommodations. Three days in the Seychelles Islands and an overnight stay in London will conclude the trip.

Tour lecturer will be Audrey Faden, a native Kenyan, who formerly served as Officer in Charge of Education at the National Museum of Kenya, Nairobi.

## Peru and Bolivia: 1981

October 15-November 1
Tour Price: $3,100

A Different Experience! A Different World! From the fabulous Incas, through Spanish Colonial times to the modern cities of today—yet maintaining its Latin charm. You'll love the green fertile valleys along the sandy desert coast of Peru; the highest railroad in the world; crossing Titicaca, the world's highest navigable lake by hydrofoil; flying over the Nazca plains. Our tour includes the fascinating cities of Lima, Cuzco, Trujillo, Puno, a train trip to fabulous Machu Picchu, and four full days in La Paz.

Dr. Alan L. Kolata, visiting assistant curator of South American archeology and ethnology, and project director, Field Museum Expeditions to Bolivia, will accompany the tour members during the entire trip. Dr. Michael E. Moseley, associate curator of Middle and South American archeology and ethnology, who for the past ten years has directed large-scale projects on the north coast of Peru, will join the group when we visit his area of research.

## Illinois Archeology

May 31—June 5

For the third consecutive year Field Museum is offering an archeological field trip which will visit Dickson Mounds, Kampsville, and Cahokia Mounds. Limited to 30 participants, the trip includes site visits, lecture and slide presentations, workshops and discussions led by staff archeologists working at the respective sites. The field trip director is Robert Pickering, anthropologist and archeologist who led the 1979 and 1980 field trips.

*[illegible] brochures, or general tour information, please [illegible] Office, 322-8862, or write Dorothy Roder, Field Museum [illegible], Roosevelt Road at Lake Shore Drive, Chicago, IL 60[illegible]*

FIELD
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## OUR ENVIRONMENT

*Con't from p. 11*

for various purposes has increased, the telemetry experts have refined their tools. Self-adjusting radio collars have been developed which expand, since young antelope, elk, deer, sheep, and small mammals may more than double their size in a season. This has relieved concern about animals which could outgrow their collars and choke before they could be recaptured and fitted with larger equipment. It also makes instrumentation a one-time task.

Each new project presents a new puzzle to the DWRC electronics specialists. An animal must accept an artificial attachment without changing its behavior pattern for information to be useful, and weight is a critical factor. The general rule is not to exceed five percent of a mammal's or three percent of a bird's weight in designing a custom transmitter. Even with miniature transistors, tiny batteries, and lightweight antenna wire, it remains a challenge to build a workable device that allows small species to run or fly, feed, mate, and rear young without interference.

Avian aerodynamics call for featherweight instruments which must be attached so that a bird's balance is not upset. Transmitters clipped to tail feathers are common, although leg attachments enable small birds to carry heavier equipment, and may eventually be used for most species. Some transmitters now in use are equipped with solar cells to recharge small batteries, thus lengthening their life.

Beyond their laboratory, which processes about 500 transmitters a year for various studies, the DWRC electronics experts hope to see commercial firms develop fully automated tracking systems that can be adapted for wildlife research. However, the Service's telemetry pioneers are less concerned with space-age showmanship than simple invention, such as applying glue to secure molting tail feathers carrying clipped-on transmitters and experimenting to see whether the G-string of a guitar or dental wire makes better antenna material.

### Porpoise Quota for Tuna Fishers

The number of porpoises allowed to be killed each year in yellowfin tuna fishing nets was reduced by more than a third in new regulations announced by the administrator of the National Oceanic and Atmospheric Administration (NOAA). During the proceedings on the new rules, the Environmental Defense Fund represented a coalition of ten environmental organizations, which advocated the quota ultimately chosen by the administrator.

The new rules, in effect for the years 1981 through 1985, impose an annual quota of 20,500. This represents a significant cut in the 31,150 limit applicable in 1980 and a dramatic reduction from actual deaths less than a decade ago. Before the 1977 success of an EDF-led legal effort to save the porpoises, several hundred thousand of them were trapped in the nets and drowned each year.

The administrator's decision ends a proceeding that began in August 1979, when a scientific workshop, reviewing porpoise population data, found several species more seriously depleted than had been suspected. The tuna industry urged continuation of the 1980 quota of 31,150, although actual porpoise kills in each of the past two years have been far below that number.

Another important aspect of the new regulations, also urged by EDF, is a prohibition on "sunset sets." This refers to the practice of initiating the setting of a purse seine around a school of porpoise so late in the evening that it cannot be completed before dark. The porpoise mortality associated with such sets is much higher than for daytime sets and has actually increased over the past three years, although total porpoise deaths have declined.

Even before the new rules were announced, several tuna boat captains filed a class action suit in San Diego to bar the government from using information gathered by federal observers aboard tuna boats in enforcement proceedings over violations of porpoise protection regulations. Since on-board observers provide the only practical means of ensuring compliance with these rules, the suit threatens to nullify their very purpose. EDF has intervened in the suit to preserve the observer program.

### Rehabilitated Eagle Regains Freedom

A young bald eagle flew away to freedom January 12 after being "hospitalized" nearly 11 weeks with an injury from a shotgun blast. The bird was found, wounded and unable to fly, in late October last year near the Little Trimbelle River south of Diamond Bluff in western Wisconsin.

It was taken to Wisconsin state wildlife officials who turned it over to the Raptor Rehabilitation Center on the St. Paul campus of the University of Minnesota. Two shotgun pellets were found in the flesh of the left wing, and the wing was broken. After the wing was repaired and the raptor was given time to recuperate, it was given daily training exercises to restore its strength and ability to fly.

The bird was released at a high bluff overlooking the Mississippi River at Prescott, Wisconsin, in the west-central part of the state. Prescott is a small community nestled at the confluence of the St. Croix and Mississippi Rivers, and is a popular wintering spot for a number of bald eagles; it offers heavily wooded river banks and ravines up and down both rivers, and a current swift enough to keep the water open most of the time during the winter. About 40 people were present to observe the release, including members of the press and television, wildlife officials from the U.S. Fish and Wildlife Service, the Wisconsin Department of Natural Resources, the Minnesota Department of Natural Resources, and individual wildlife enthusiasts.

When taken from a crate by Patrick Redig of the Raptor Rehabilitation Center, the full-grown eagle, weighing eight pounds and having a wing span of 6½ feet, exhibited an obvious eagerness to part ways with its benevolent captor. Within seconds after the release it was little more than a dot against the sky, high over the river bluffs. The bird carried a leg band and a highly visible wing marking. Wildlife officials hope that anyone who spots the bird in the future will report it to state or Federal wildlife officials.

A reward of up to $3,000 is still being offered for information leading to the arrest of the person who shot the eagle. Under the Bald Eagle Act the FWS can pay rewards amounting to half of any fine imposed, with a maximum of $2,500. The National Wildlife Federation, Washington, D.C., is offering $500.

In Wisconsin and four other states — Minnesota, Michigan, Oregon, and Washington — the bald eagle is classified as a threatened species under the Endangered Species Act. In these states the maximum penalty for shooting an eagle is one year in prison and/or a $5,000 fine. The bird is classified as an endangered species in the other 43 contiguous states.

### Manatee Sanctuaries Established

On November 12, 1980, the U.S. Fish and Wildlife Service established the first permanent manatee sanctuaries: in Kings Bay, Crystal River, Florida. Waterborne activity is to be prohibited within them between November 15 and March 31 of each year. They are known as the Banana Island Sanctuaries, Sunset Shores Sanctuary, and Magnolia Springs Sanctuary. Boat access to residences, boat houses, and boat docks in the sanctuaries will be permitted by residents and their authorized guests by obtaining and displaying stickers provided by the Service. They will be required to maintain idle speed within the sanctuary.

The regulation which allowed the Service to designate these permanent

*Continued on p. 27*

# HONOR ROLL OF DONORS

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(Period of July 1, through December 31, 1980)

We wish to recognize those generous donors to Field Museum who in 1980 helped to maintain a balanced budget. The year ended with no debt or deficit financing, thanks to these and thousands of other donors. By way of recognition, we place on the Honor Roll of Donors the following who contributed $1,000 or more during the period July 1 through December 31, 1980. (Donors earlier in the year — January 1 through June 30, 1980 — were recognized in the September 1980 *Bulletin*).

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## OUR ENVIRONMENT

*Con't from p. 25*

manatee protection areas also provided for the emergency establishment of such areas. On January 11, 1980, approximately 2 acres adjacent to Warden Key on Kings Bay were established under this emergency provision as a manatee refuge. This designation expired March 31, 1980.

Following the expiration of the emergency designation, the three areas in Kings Bay were proposed as manatee sanctuaries. The Warden Key area was deleted from the proposal because it lacked a warm water source which limited its effectiveness as a sanctuary. The area did, however, effectively demonstrate the need to provide habitat free from disturbance from waterborne activities.

The Banana Island and Sunset Shores Sanctuaries are adjacent to, but do not include, the main spring. However, they do include secondary springs. Diving activities will still be allowed at the main spring, providing recreational opportunity to observe and interact with those manatees that are tolerant of human presence. The Magnolia Springs Sanctuary contains a warm water spring known as Magnolia Spring, or "Alligator Hole." This area is located in a section of canal within the Springs O'Paradise subdivision.

The warm springs provide manatees with areas where water temperatures are moderated during cold weather periods. Manatees tend to "congregate" around the warm springs during these critical periods. In an effort to observe and interact with manatees, human activity increases at these manatee "congregations." This disturbance causes manatees to flee these warm spring areas, subjecting them to physiological stress and increasing the potential for mortality. Disruption of normal mating or calf rearing behavior may also result.

The sanctuaries are intended to provide areas free of disturbance to manatees. Over 100 individuals out of an estimated population of 1,000 animals have been known to use the Kings Bay-Crystal River area.

### Asbestos in Schools

The Environmental Protection Agency has responded to a two-year EDF effort to get action on the health hazards of asbestos materials in school buildings. EPA has proposed that school districts be required to inspect schools for disintegrating asbestos, primarily in ceilings. A 1978 EDF petition, followed by a 1979 EDF lawsuit, prompted EPA's response to this issue. Newly-passed legislation authorizes the Department of Education to make interest-free loans or grants to pay some of the cost of repair or replacement, if Congress appropriates the necessary funds. EDF commented on the inspection regulations and will do so for the repair regulations when they are proposed this spring.

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# *March and April at Field Museum*

*March 16 to April 15*

### Continuing Exhibits

Hall of Amphibians and Reptiles. Take a look at the Komodo dragon, one of the most impressive residents of Hall 19 and the subject of Field Museum's March 29 lecture (see below). The world's largest living lizard shares the hall with models of reptiles closer to home — the snakes, frogs, turtles, and other reptiles one might find in the Chicago area. The skull of a 15-foot man-eating crocodile is part of an exhibit that explains just how to tell a crocodile from an alligator. Hall 19, ground floor.

Hall of Physical Geology. Examine the materials and structures of the earth, and learn something about the interplay of forces that are shaping it. This hall contains exhibits on the main classes of rocks and on volcanoes and earthquakes. There are displays illustrating the work of wind, water, and ice in leveling and building up land features. Examples of the interplay of earth forces and processes are shown in four dioramas: a valley glacier, a limestone cave, an active volcano, and the Grand Canyon. Hall 34, second floor.

### New Programs

Ray A. Kroc Environmental Lecture. "Science and Science Fiction: Creativity vs. Credibility" is the topic of a provocative lecture by Ben Bova, novelist, lecturer, and executive editor of *Omni Magazine*. He will examine the processes that lead to creativity in the arts and sciences, with examples ranging from Galileo to Velikovsky. Then he will trace the origins of such science fiction ideas as humanoid robots, death rays, and interstellar flight and look into the future to determine if and when they might become reality. Friday, March 20, 8 p.m. Members $2, nonmembers $4. Tickets are available in advance, or at the West Door before the program. For information, call 322-8854 during business hours.

"The Komodo Dragon." Dr. Walter Auffenberg, curator of herpetology, Florida State Museum, presents a slide lecture on the Komodo dragon, a living relic of 60 million years ago and the world's largest lizard. (Some reach a length of 10 feet and weigh 250 pounds.) Dr. Auffenberg and his family lived for nearly a year on the island of Komodo in Indonesia studying the behavior and ecology of these unusual land reptiles. Sunday, March 29, 2 p.m., Lecture Hall I. Free.

Edward E. Ayer Film Lectures. See the sights of foreign lands through 90-minute illustrated lectures during March and April. Admission is free at the barrier-free West Door; show membership card for priority seating. Programs recommended for adults. Sundays, [illegible] p.m., Simpson Theatre. (When the theatre [illegible] seating capacity the doors will be closed [illegible] in compliance with fire regulations.)

☐ March [illegible]

☐ March 28: "Shangri-La"

☐ April 4: "Turkey"

☐ April 11: "Scotland"

Gamelan Miniconcerts. Field Museum's adult education class, Gamelan Performance Ensemble, presents miniconcerts under the direction of Dr. Sue Carole DeVale. Free. Sunday, March 29, 2 and 3 p.m., Hall K, ground floor.

Gamelan Concert. This is the annual performance by the advanced class, Gamelan Performance Repertoire. The group has been playing together for three years. Free. Sunday, April 12, 2 p.m., Simpson Theatre.

Spring Journey: "A Time to Sow: The Story of Seeds" illustrates how different cultures use seeds for food, money, and even musical instruments. Wind your way through Museum halls and learn about the important role of seeds in human culture. Free *Journey* pamphlets are available at Museum entrances.

Weekend Discovery Programs. Participate in a variety of free tours, demonstrations, and films every Saturday and Sunday between 11 a.m. and 3 p.m. Check the *Weekend Sheet* at Museum entrances for locations and additional programs.

Saturday, March 21: "Museum Highlight Tour," 2 p.m.

Sunday, March 22: "Life in Ancient Egypt" tour, 1:30 p.m.

Saturday, March 28: "Museum Highlight Tour," 2 p.m.

Sunday, March 29: "Chinese Ceramic Traditions" tour, 1 p.m.

Sunday, March 29: "The Visual Record of North American Indians" slide program, 2:30 p.m.

Saturday, April 4: "Ancient Egypt" tour, 11:30 a.m.

Saturday, April 4: "Life in a Tropical Forest" film, 1 p.m.

Sunday, April 5: "American Indians: Portraits in Oil" slide program and tour, 2:30 p.m.

Saturday, April 11: "Boreal Forest" film, 1 p.m.

Sunday, April 12: "Indian Life on the Prairies" tour, 1 p.m.

### Continuing Programs

Volunteer Opportunities. Individuals with scientific interests and backgrounds are needed to work in various Museum departments. Contact the Volunteer Coordinator, 922-9410, ext. 360.

March and April Hours. The Museum is open from 9 a.m. to 5 p.m. every day except Friday. On Fridays the Museum is open from 9 a.m. to 9 p.m. throughout the year.

The Museum Library is open weekdays from 9 a.m. to 4 p.m. Obtain a pass at the reception desk, North Entrance.

Museum Phone: (312) 922-9410

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# Field Museum of Natural History Bulletin

April 1981

NATURAL HISTORY SURVEY
APR 13 1981
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*KATHAKALI SOUTH INDIAN DANCE DRAMA: MAY 15*

## MEMBERS' NIGHTS:
## APRIL 30, MAY 1

# Field Museum of Natural History Bulletin

April 1981
Vol. 52, No. 4

*Editor Designer:* David M. Walsten
*Production:* Martha Poulter
*Calendar:* Mary Cassai
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*Director:* Lorin I. Nevling, Jr.

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*Member of Kathakali South India dance-drama group applies makeup. Photo by Malcolm Lee. For program details see page 26.*

# 30th Annual Members' Nights

## April 30, May 1

**Have you ever seen a sheep shorn?** Or a tipi raised? You can at the Museum's 30th Annual Members' Nights, the behind-the-scenes view of Field Museum which will take place on Thursday, April 30, and Friday, May 1, from 6:00 to 10:00 p.m. (Third Floor opens at 7:00 p.m.)

This year, highlights from our various ethnic festivals will be featured, including a Taichi demonstration from the China festival; "Alma de Mexico," a Mexican folk dancing group from our Latin American Neighbors Day festival; and demonstrations of sheep shearing, spinning, quillworking, beadworking, and silversmithing plus a tipi-raising from our North American Indian Heritage Day festival. Other highlights include:

**Ground Floor:** Your Name in Egyptian Hieroglyphs, Sea Snakes at the Field Museum, Lots of Lizards in Jars, Gamelan Orchestra Session.

**First Floor:** Journey to the Center of the Museum; Discovery Tours, including "Stories of the Field Museum" and "China Through the Ages"; Members' Treasure Hunt.

**Second Floor:** Keeping It All Together for Putting It Back Together—cleaning and mounting of textiles and costumes from the Field Museum collection, Electronic Production of Range Maps.

**Third Floor:** Dust to Dignity: Rediscovering the Pacific, Fossils in Concretions: Coal-Age Plants and Animals of Illinois, Display of Mineral Specimens Used in Field Museum Calendar, Mount St. Helens: The Volcano that Blew Its Top, Scorpions, Centipedes, Spiders and Other Venomous Creatures, How Plants Get Their Latin Names.

**Fourth Floor:** Putting an Exhibit Together, Capturing Specimens in Art—Scientific Illustration, Graphics Demonstration.

Free parking is available in the north Museum and Soldier Field lots. A shuttle bus will circle these areas continuously, providing free transportation to and from the Museum. Or use the free round-trip charter bus service between the Loop and the south entrance of the Museum. These *CTA* buses marked *FIELD MUSEUM* will originate at the Canal Street entrance of Union Station and stop at the Canal Street entrance of Northwestern Station, Washington and State, Washington and Michigan, Adams and Michigan, and Balbo and Michigan. Two buses will run circuits beginning at 5:45 p.m. and continuing at 15-minute intervals until the Museum closes. (Both buses will travel to the train stations until the departure of the last train. Please check your train schedule for the exact times.)

Reasonably priced dinners and snacks will be available in the Museum food service area from 6:00 p.m. to 8:00 p.m.

To achieve a more even distribution of visitors, we suggest you follow this alphabetical schedule:

| | |
|---|---|
| A through L | Thursday, April 30 |
| M through Z | Friday, May 1 |

Admittance will be by invitation, so please retain your Members' Night invitation and present it at the door for admittance for you and your family.

We look forward to seeing you!

# FIELD BRIEFS

Ron Testa

*John Terrell*

### Swartchild, Chairman of Board, Honored

At a February 20 dinner at the Ambassador West Hotel, the Harvard Club Award for outstanding community service was given to William G. Swartchild, Jr., chairman of the Field Museum Board of Trustees. Swartchild has served as a Museum trustee since 1966 and was elected chairman in 1978. He is also board chairman for Children's Memorial Hospital and for Northwestern University's McGaw Medical Center.

*William G. Swartchild, Jr.*

James Swartchild

### Curator Terrell Awarded Fulbright

John Terrell, associate curator of Oceanic archeology and ethnology, has been awarded a Senior Fulbright Fellowship at the University of Aukland, in New Zealand. During his six-month stay there, he will teach courses in Pacific archeology. As a graduate student 16 years ago, Terrell had conducted research at the University as a Fulbright-Hays Fellow. While in New Zealand, Terrell will also continue work on a current project, a book about the prehistory of the South Seas, *Science and Prehistory in the Pacific Islands*.

### Gifts in Kind

Recent gifts of specimens to Field Museum include the following: Commander and Mrs. G. E. Boone, of Monmouth, IL, have given a group of Japanese ceramic dishes, bowls, snuff bottles, goblets, lacquer boxes and similar materials; Mr. John J. Hoellen, of Chicago, has given a collection of Chinese porcelains; the University of Chicago has given a collection of Middle Stone Age artifacts; Mr. Hisazo Nagatani, of Chicago, has given a collection of *hikite* (door pulls). David Kistner, a research associate in the Division of Insects, has given a collection of 2,783 beetle specimens.

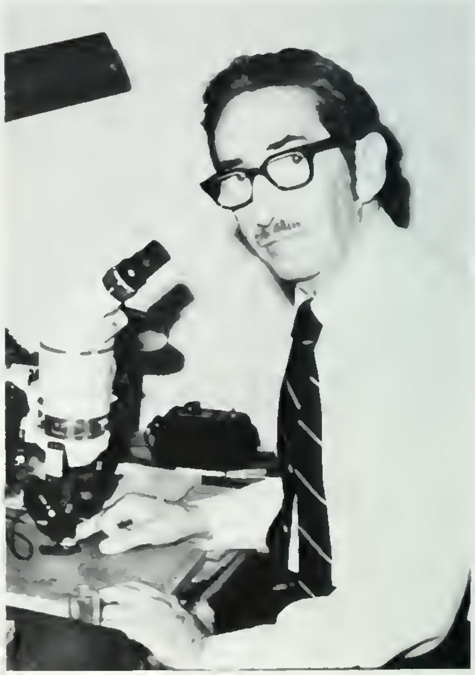
Dr. and Mrs. Karl Menninger, of Topeka, KA, have given nine Navajo rugs; Mrs. Marjorie P. Bohrer, of Winnetka, IL, has given three Navajo rugs; Mr. Harold E. Waller, of Kewanee, IL, has given a Persian carpet; Dr. Eugene L. Dellinger, of Fort Wayne, IN, has given a 1.85 carat natural ruby.

### Herman Abendroth, John Bayalis, Walter Segall

Herman Abendroth, who was head of Field Museum's Division of Photography at the time of his retirement in 1950, died November 21 at the age at 95. A native Chicagoan, Abendroth joined the Museum staff in 1921.

John Bayalis, who succeeded Abendroth as head of the Division of Photography in 1950, died on January 20. Also a native Chicagoan, Bayalis spent his entire professional career with the Museum, joining Harris Extension (a division of the Department of Education) at the age of 18 and retiring 50 years later, in 1975. He transferred from Harris Extension to the Division of Photography in 1948. Following his retirement, Bayalis continued to serve the Museum as a volunteer in Photography and the Department of Botany, coming in faithfully up until the week before his sudden death at the age of 73.

Walter Segall, research associate in the Department of Geology since 1969, died November 25 at the age of 79. An otolaryngologist with a practice in Chicago, Segall also had a strong interest in the comparative anatomy of the ear region in living and fossil mammals, the subject of the research he conducted at Field Museum. Five of his technical papers, on the auditory region in mammals, were published in *Fieldiana*.



*Walter Segall*

*John Bayalis*

### "Marine Hunters and Fishers" Project Awarded $625,422 NEH Grant

The rehabilitation of Field Museum's Northwest Coast and Inuit ethnographic materials in Hall 10, the project known as "Marine Hunters and Fishers," has been awarded a grant of $625,422 by the National Endowment for the Humanities. This is one of the largest amounts ever received by the Museum for a project of this type. The hall is scheduled to open in 1982, and will present one of the world's finest assemblies of such materials.

A grant in the amount of $23,000 has been awarded by the National Science Foundation in support of the project "Phylogeny and Biogeography of Helicoid Land Snails," under the direction of Alan Solem, curator of invertebrates. This support is a continuation of NSF funding which began in 1978 and now totals $77,775 for this project.

Edward J. Olsen, curator of mineralogy, has been awarded a $14,557 grant from N.A.S.A. in support of his project, "Refractory Inclusions in the Murchison Meteorite."

Ron Testa

**Susanmary Young**, *secretary to Field Museum President E. Leland Webber, receives felicitations from Thomas Sanders, vice president of development (left), and Donald Fischer, chief of Security and Visitor Services, on the occasion of her retirement, February 27. They are shown at a reception in Mrs. Young's honor, held in the President's room.*

*Mrs. Young came to the Museum in 1944 as secretary to Orr Goodson, then acting director of the Museum. She had expected to stay, she confesses, "only two years."*

### Systematics Symposium Papers Published

*Biotic Crises in Ecological and Evolutionary Time,* edited by Matthew H. Nitecki, curator of fossil invertebrates, has been published by Academic Press, New York. The 301-page work consists of nine papers presented at the third annual Spring Systematics Symposium, held at Field Museum in May 1980. Three of the papers are by Field Museum staff: "Introduction: What Is a Crisis?" by David M. Raup (dean of science), "The Great American Interchange — An Invasion-Induced Crisis for South American Mammals," by Larry G. Marshall (Department of Geology), "Living with Crises: Human Perception of Process and Time," by Michael E. Moseley and Robert A. Feldman (Department of Anthropology), and Charles R. Ortloff. The price of the book, available at the Field Museum Shop, is $25.00; 10 percent discount for members.

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## OUR ENVIRONMENT

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### Microscopic "Tags" for Wildlife

They are so small they escape the notice of animals indelibly marked by them, but microscopic plastic particles as distinctive as fingerprints may soon have a big impact on wildlife research. The particles, now being tested by the U.S. Fish and Wildlife Service, could reveal valuable information long sought by scientists who study the ways of wildlife.

Microtaggants—salt-sized, color-coded plastic chips originally manufactured by the 3M Company to trace explosives used in criminal acts—may revolutionize the time-honored practice of marking animals for various purposes. "Recognition marking" was attempted before the nineteenth century by ornithologists and ichthyologists to establish ownership, send messages, and learn bird and fish movements. Izaak Walton's *The Compleat Angler* in 1653 alluded to experiments where young salmon had ribbons tied to their tails to demonstrate their return to spawn. The earliest known bird marking dates back to ancient Rome.

Today, marking is a basic tool of fishery and wildlife biologists who use tags, streamers, dyes, even radioactive isotopes, to learn behavioral information not otherwise available. Microtaggants could make marking easier for researchers, safer for animals, and cheaper for the federal government, with unique codes, durability, and ease of detection and recovery.

The tiny tags are made of up to 10 layers of inert plastic sandwiched in a special color sequence to make an identifying code. Available with fluorescent and ferromagnetic layers, they can be quickly spotted under ultraviolet light and easily picked up for decoding with a small magnet. Although the particles are unobtrusive and do not interfere with animal behavior, they can be detected and decoded by any field researcher with a portable microscope.

Application methods now being tested may further increase the usefulness of the particles; for example, aerial spraying may make mass marking of birds practical for the first time. Blackbirds and starlings can spread disease or cause considerable damage to crops. Researchers need more information about these birds, which sometimes congregate in roosts by the millions, so they can be effectively controlled.

Fish and wildlife fed food laced with the flakes could give biologists important short-term information. Service scientists continue to study predator-prey relationships, and the markers may help solve nature's "whodunits" — identifying preying species and evaluating their effects. To learn how mink affect the duck population in a certain area, for example, a researcher could mark eggs or ducklings in nests, and mink droppings could be tested for the markers' presence.

# THE FIELD MUSEUM
# *Spotlight on The Collections*

## Part III

By MATTHEW H. NITECKI
*curator of fossil invertebrates*

### DEPARTMENT OF ZOOLOGY

At the founding of Field Museum in 1893, a Department of Zoology was contemplated that would include all animal life, for which the divisions of Ornithology, Mammalogy, Herpetology, Ichthyology, Entomology, Conchology and Osteology were set up. However, when it was learned that it would be possible to acquire the 19,000 specimen bird collection of Charles B. Cory in exchange for creating a Department of Orinthology with Cory as curator, that step was taken, and the two departments were formed together, one as Department of Ornithology, the other with the awkward title of Department of Zoology, except Ornithology. This name it bore for 12 years.

During the early years of the department, the staff consisted of Curator D. G Elliot, and as many assistants as he could wangle. These were assistant curators in Zoology, no matter what their particular discipline, and presumably had multiple responsibilities among the several divisions. The first two, O. P. Hay and S. E. Meek, serving consecutively, were both Ichthyologists, but Meek was noted in one annual report as relabeling the shell collection. Although Meek was sometimes referred to as assistant curator for Ichthyology, the first person to receive a formal appointment in a given division was W. J. Gerhard, who was made assistant curator for Entomology in 1900; his tenure had spanned half a century when he retired in 1950. In the meantime, the Department of Ornithology was developing under Cory, a lifetime curator without residence obligations, and his assistant curators G. K. Cherrie and N. Dearborn.

In 1906 there was the upheaval that brought Ornithology back into Zoology. Elliot, the eminent ornithologist and mammalogist who was the first curator of Zoology, resigned to return to the American Museum of Natural History in New York. At the same time, the wealthy Cory lost his fortune and was forced to seek a paying job. The problem was resolved by uniting the departments and making Cory curator of Zoology, where he was extremely productive, publishing books on the birds and mammals of Wisconsin and Illinois, and starting publication of the Catalogue of the Birds of the Americas, eventually completed in 11 parts, comprised of 15 volumes. During his tenure most of the divisions received their own or a shared assistant curator. E. N. Gueret took over Osteology in 1906, W. H. Osgood Mammalogy and Ornithology in 1909, and Carl Hubbs, briefly, Ichthyology and Herpetology in 1916, to be succeeded by A. C. Weed in 1920.

Osgood came to Field Museum after establishing an excellent reputation as a young scientist with the Biological Survey, studying particularly the difficult rodent genus *Peromyscus*. During his 32 years here, he became the leading authority on Neotropical mammals, but his interests were worldwide and he also collected and published on the mammals of Africa and Indo-China. A new division, Oology, was created in 1917 to accept the bird egg collection of Judge R. Magoon Barnes, and Barnes was appointed absentee curator. This division lasted during Barnes's lifetime, and the eggs became part of the collections of the Bird Division in 1945.

On the death of Cory in 1921, there was considerable change and expansion, with all dual appointments being ended. The names of the divisions were Anglicized and all the *ologies*, except Osteology, were dropped; Ornithology became Birds, Entomology became Insects, and so on. Osgood was made curator, and he was replaced in Birds by J. T. Zimmer, and in Mammals by E. Heller. Weed was restricted to Fishes and was replaced the following year in Reptiles and Amphibians by K. P. Schmidt. Only Lower Inver-

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**Division of Mammals:** *Research Associate Jack Fooden*

tebrates lacked its own assistant curator. Schmidt was not only a first-rate herpetologist, but a world-renowned ecologist. His influence extended well beyond his published works, for he was devoted to young students and inspired many to adopt careers in science. Upon his retirement in 1955, he was elected to the National Academy of Sciences, the first member of the museum staff to be so honored.

In 1922 came the appointment of the first associate curator, C. E. Hellmayr in the Division of Birds, who was hired to complete the Catalogue of Birds of the Americas that had just been started by Cory. Hellmayr was at that time the preeminent student of neotropical birds, and he brought with him a first-hand knowledge of European collections and of the types of neotropical birds that was unsurpassed. Although he returned to Europe in 1931 to be nearer the historical collections there, he remained on the staff and continued to submit manuscripts for the Catalogue. He was forced to flee Austria to Switzerland when the Nazis invaded, but he continued his work as best he could, and the last four volumes were completed in collaboration with Boardman Conover, research associate in the Division. Conover, a wealthy young Chicago sportsman, had been guided into scientific ornithology by Osgood, starting in 1920, and had formed a superb collection of game birds of his own, housed in the museum and eventually becoming part of the museum's collections. The completed Catalogue, the joint product of Cory, Hellmayr, and Conover between 1918 and 1949, is still the basic taxonomic text for New World birds.

The next major change, at least in titles, in the Department came in 1936, when the curator became known as chief curator, assistant curators were promoted to curator, and assistants, such as E. R. Blake in Birds, and D. D. Davis in Osteology were made assistant curators. The last *ology* was lost when Osteology was renamed Vertebrate Skeletons. This division had two more metamorphoses to go, becoming Anatomy and Osteology in 1938, and Vertebrate Anatomy in 1946; it was finally phased out in 1972 and its collections dispersed to the respective vertebrate divisions. In 1938, the final division received its own curator when Fritz Haas, another Hitler refugee, was appointed in Lower Invertebrates (née Conchology). Haas was a world-renowned authority on fresh water clams, and he maintained a prodigious productivity during his years at Field Museum.

*Division of Amphibians & Reptiles.* The Division of Amphibians & Reptiles was established at Field Museum with the arrival of Karl P.Schmidt in 1922. The specimens in the collection now number over 212,000, including 3,200 skeletons as well as cleared and stained materials. The collection is cosmopolitan but has particular strength in materials from Mexico, Colombia, Chile, Egypt, Southwest Asia, the Congo, South Africa, the Philippines, Borneo, Malaysia, and Thailand. Our collections from the latter three countries are strong both in terms of breadth of coverage and ecologically useful series. The crocodilian collection is one of the foremost in the United States. A large portion of the Edward H. Taylor collections have been deposited here as well as numerous other collections that are heavily cited in publications. A total of 1,139 types is housed adjacent to the main collection. The collection as a whole was rated as one of the five major collections in the country by the Committee on Resources commissioned by the Association of Systematic Collections and three herpetological societies.

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**Division of Invertebrates:** *Scientific illustrator Linnea Lahlum. An important activity in each of the divisions is the rendering of scrupulously accurate anatomical drawings of specimens.*

The collection itself is housed on the ground floor with adjacent offices and a specimen preparation/visitor area. The outstanding Karl P. Schmidt Memorial Library containing over 30,000 titles is also located here. Special collections of histological slides, tape recordings, photographs, and stomach contents are also maintained.

The herpetological collection is heavily used nationally and internationally with frequently over 50 loans per year, including a total of around 1,500 specimens.

Extensive field work in the 1950s and 1960s in Southeast Asia by the then head of the Division, Robert F. Inger, have led to systematic works on the herpetofauna as well as studies with an ecological orientation. Curator Hymen Marx, in collaboration with Research Associate George Rabb, has done his research on the relationships of advanced snakes with an emphasis on the viperids. Research on various aspects of the biology of marine snakes has held the interest of Harold Voris since he joined the staff in 1973.

*Division of Birds.* Established in 1894 as a separate Department of Ornithology, the Division of Birds today houses the third largest scientific bird collection in the United States. The main collection contains approximately 315,000 specimens, including 600 holotypes, 2,800 skeletons, and 1,500 fluid specimens. In addition, the division houses 16,500 egg sets and 200 nests. The scope of the collection is worldwide, with major geographic strength in North America, Mexico and Central America, South America, Africa, and the Philippines. Included among its many historically and scientifically valuable, individual collections are the H. B. Conover Game Bird Collection, Good's and van Someren's African collections, C. B. Cory's West Indian collection, the Bishop Collection of North American birds, a large portion of Koelz's material from India and the Middle East, and a large series of separate collections from South America, Africa, and the Philippines. A collection of 11,500 skins recently acquired from Princeton University are presently being cataloged into the main collection.

Current research projects focus on the systematics and biogeography of South American birds, especially the Tyrannidae, including primary collecting in remote areas of the Peruvian Andes. A salvage program produces roughly 1,000 skin, skeleton, and fluid specimens of local Illinois migrants and zoo specimens annually. These are available for exchange with other systematic collections.

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**Division of Amphibians and Reptiles:** *(Above) Alan Resetar, custodian of the collection, examines shipment of sea snakes collected in the Straits of Malacca in 1975 by Harold Voris (below, left), associate curator of amphibians and reptiles.*

**Division of Birds:** *Emeritus Curator of Birds Melvin A. Traylor (center) examines shipment of birds from Bolivia. With him are Dianne Maurer (left), division assistant, and Volunteer Margot Merrick. (1973 photo)*

A major goal of present and future accessions is to improve the breadth of the anatomical collections.

Besides the regular staff, Curator Emeritus Emmet R. Blake works regularly on the second volume of his *Manual of Neotropical Birds*, and Curator Emeritus Traylor is finishing a manuscript for the final volume of *Peters' Checklist of the Birds of the World*.

*Division of Fishes.* Established in 1894, the collection of fishes at Field Museum now contains an estimated 1.4 million specimens in about 110,000 lots. About 85 percent of the collection is cataloged. The scope of the collection is worldwide including material from all continents, all oceans, most major seas, and many island groups. The collection is about equally divided between freshwater (mainly the Americas, also important old world material) and marine (mainly western Atlantic, but with worldwide representation). Collections of premier importance include material from freshwaters of Central and South America, the western tropical Atlantic (holdings from the Caribbean coast of Central America are unequalled), and fresh and nearshore marine waters of North America. First-rate collections include material from east Asia, southeast Asia and the Indian and Pacific Oceans (open sea, continental, and insular — both freshwater and marine). Also included is diverse material from other areas, including areas otherwise poorly represented in U.S. collections (among them: Iraq, Lebanon, Szechwan, etc.). Some 300 families and an estimated 7,000 nominal species are represented. Holdings of type materials (800 primary types, 600 secondary types) place the Field Museum collection among the five most important type depositories in North America. In addition to type holdings, there is considerable material with substantial historical importance, especially from the United States, Mexico, Central and South America collected and/or reported by such early workers as Eigenmann (and his students), Meek, Meek and Hildebrand, and A. J. Woolman. The Owston collections from east Asia (especially Japan) also include historically important material. In 1979, nearly 10,000 specimens (*ca.* 1,500 lots) were sent in 63 separate loan transactions. Growth of the collection averages 2.2 percent per year.

The Division of Fishes was led by the late Loren P. Woods for nearly 40 years, 1941 to 1978. Woods amassed large and important collections of both freshwater (North America) and marine (western Atlantic, Indian, and Pacific Oceans) fishes. He worked on a wide diversity of freshwater and marine groups, and is especially remembered for work on damselfishes and berycoids.

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**Division of Fishes:** *Assistant Curator Donald J. Stewart, division head, measures specimen. Shelved bottles behind him contain fish specimens in alcohol.*

Robert Karl Johnson joined the staff in 1972, and served as head of the Division until Jan. 1, 1981, when he was named chairman of the Department of Zoology. The bulk of Johnson's published work is on the systematics and zoogeography of a variety of mesopelagic groups. More recently Johnson in collaboration with David W. Greenfield (research associate and professor of biology at Northern Illinois University) has been working on a faunistic/ecological study of the shorelines of Belize, Central America. The more than 300 marine collections from Belize and Honduras amassed by Greenfield and Johnson since 1970, added to the material previously collected, have led to the unequalled importance of Field Museum collection of fishes from the Caribbean coast of Central America.

Donald J. Stewart joined the staff in 1979, as assistant curator of Fishes. His research background includes such diverse areas as systematics and ecology of various African freshwater groups, population/community ecology of Lake Michigan salmonids and their prey, and systematics and distributional ecology of U.S. Atlantic seaboard fishes. More recently, Stewart has been working on South American freshwater fishes and has engaged in extensive fieldwork. His long-range goals include a faunistic study of the freshwater fishes of Ecuador and systematic studies on a variety of neotropical groups.

*Division of Insects.* The core staff is supplemented by temporary grant, student, and volunteer help, when possible. Henry S. Dybas and Rupert S. Wenzel, curators emeriti, as well as a number of research associates, enlarge the scientific scope of the division.

The collections, offices, laboratories, and library occupy 12,127 sq. ft. The pinned collections, approximately 13,000-drawer capacity, with 80 percent expansion space, are housed in standard wooden drawers, stored in metal cabinets of various drawer capacity. The alcohol-preserved specimens (more than 100,000 lots) are stored in vials in communal jars kept in aluminum trays to maximize the utilization of space. Microslide preparations are kept in metal trays housed in cabinets.

The collection encompasses all arthropods, including fossils in amber, except Crustacea. It presently includes more than 2,680,000 specimens and lots, and more than 115,000 identified species; about 65 percent of the specimens in the organized collection are identified to species. More than 7,500 species are represented by primary types and several thousand others by paratypes and cotypes.

All of the major orders are represented. In general, the collections are especially strong for North America, South America, the Palearctic Region, the Philippines, Micronesia, and Australia. Those of Coleoptera, macrolepidoptera and ectoparasites are strong and representative for the world.

Numerically, the strongest representation, taxonomically and geographically, is of Coleoptera, totalling almost 2 million specimens. Within this order, are a number of specialized units, including collections of historic significance. Staphylinidae — 240,000 specimens, representing about 20,000 identified species and more than 4,000 types, the Bernhauer, Bierig, Benick, and Seevers collections (an additional 300,000 specimens await preparation); Cleridae — 13,000 specimens, 1,000 species, the A. B. Wolcott and Josef Knull collections; Dryopoidea — 50,000 specimens; Histeridae — 50,000 specimens (75 percent of the world species), the C. A. Ballou collection; Leiodidae — 13,500 specimens (55 percent of the world species), the Knirsch collection; Lucanidae — 10,000 specimens (55 percent of the world species), the Benesh and Knirsch collections; Meloidae — 15,400 specimens, broad range of generic representation and palearctic species; Mordellidae — 17,500 specimens, the Eugene Ray collection (the Liljeblad collection is here on indefinite loan); Pselaphidae — 30,000 specimens (the Park, Bierig, Steeves, Schmidt, and Reichle collections) plus 40,000 to be prepared; Ptiliidae — 260,000 specimens; Scarabaeidae — approximately 130,000 specimens, broadly representative at the generic level, the Ondrej and Knirsch Collections, especially Cetoniinae, 78 percent of the world genera, 55 percent of the world species; Tenebrionidae — 47,000 specimens, broad range of generic representation.

The Lepidoptera collection — 150,000 specimens, 75 percent of the U.S. species, including the Strecker Collection of Macrolepidoptera (on indefinite loan to the Allyn Museum of Entomology). The Isoptera collection contains nearly 50 percent of the world species, donated principally by A. E. Emerson. Ectoparasites of vertebrates are represented by: batflies — 40,000 specimens, 70 percent of the world species, types of 40 percent; fleas — about 35 percent of the world species, types of 25 percent of Neotropical species; sucking lice — about 30 percent of the world species; ticks — 40 percent of the described species; major holdings of parasitic mites from Neotropical and Australian hosts. The water mite collection — types of about 90 percent of the North

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**Division of Insects:** *Preparator Laurel Johnson with some of the showy scarabs in the beetle collection.*

American species (Ruth Marshall collection), 90 percent of the Indian and Ethiopian species (deposited by D. Cook). Specialized groups of free-living mites (Opilioacariformes, Holothyrida, Trygynaspida) and arthropod-associated mite species (Heterozerconoidea, Eviphidoidea) are well represented. The Myriapoda collection has much Neotropical and African material and about 100 holotypes. The collection of Baltic Amber fossil insects, about 2,800 pieces, is especially rich in microlepidoptera, diptera and spiders. A significant block of unprepared specimens is contained in the *Berlese* residue collection (modified Tullgren samples of the leaf-litter and forest floor community); 6,000 samples, an estimated 2 million specimens, from North America, Central America, Australia, New Guinea, Nepal — especially rich in microcoleoptera, diplopods, spiders, and mites.

During the past 5 years, 455 loans, totalling 139,437 specimens, were made to professional systematists or graduate students.

*Division of Invertebrates.* In August of 1938, the Division of Invertebrates was established with the hiring of Fritz Haas (formerly of the Senckenberg Museum, Frankfurt-am-Main) as the first curator and head. Crates containing the 11,312 lots of mollusks and other miscellaneous invertebrates (exhibits from the 1893 Field Columbian Exposition) were opened, and the work of rehousing, relabelling, and reidentifying, and increasing the collections was undertaken by Haas, strongly supported by the Museum administration. By 1957, when G. Alan Solem was appointed assistant curator, Haas had managed to increase the mollusk collection to well over 55,000 lots.

In 1979, the collections totalled more than 225,000 lots, or approximately 2,500,000 shells and preserved mollusks and other invertebrates, indicating the growth of the division since Solem became curator and head. The research materials consist of land and freshwater taxa, and a synoptic species representation of most large-sized marine groups. Emphasis is worldwide and land mollusks, with the greatest strengths in North American, Neotropical, West Indian, Pacific Basic, and Australian geographic areas.

The main emphasis of collecting efforts since 1974 has been the land mollusks of Australia, while the building of the collection in other geographic areas continues.

*Division of Mammals.* The Division of Mammals presently has 122,000 specimens. Established in 1894, the collection is worldwide in scope and is one of the largest and most representative collections of mammals in the United States. In terms of absolute numbers of specimens, it ranks fifth or sixth, and in terms of worldwide coverage and representation of families, genera, and species, it probably ranks third in the nation and fourth in the world. We have 485 type specimens.

Nearly 40 percent of the specimens are Neotropical, followed by 17 percent Nearctic, 16 percent Palearctic, 14 percent Oriental, and 13 percent Ethiopian. From the Neotropical region, Mexico, Belize, Guatemala, Colombia, Bolivia, Peru, Chile, and Brazil are particularly well represented. Important collections from the Palearctic include those from Afghanistan, Iran, Egypt, and China; from the Oriental are Philippines, Borneo, Malaysia, India, Ceylon, Nepal, Sikkim, and Burma; and from the Ethiopian are Sudan, Ethiopia, and Angola.

With the exception of two families of whales (Eschrichiidae, Balaneopteridae), one family of marsupials (Notoryctidae), one family of bats (Crasconycteridae) and one of rodents (Selveninidae), all extant families and approximately 80 percent of all extant genera are represented. As may be expected, rodents and bats are especially well represented. The primate collection is unique due to the endeavors of Philip Hershkovitz.

Most of the specimens are study skins with skulls, but some 20,000 are fluid-preserved. In addition, we have 3,000–5,000 partial and complete skeletons that were made available by anatomist D. Dwight Davis as well as 900 anatomical preparations, a baculum collection and an auditory ossicle collection.

The Division of Mammals is presently housed in a new fourth-floor addition totalling 24,610 sq. ft. There are eight ranges; seven for dry specimens are on compact storage units and one for wet specimens is on stationary shelving. There are two spacious labs, one associated with the fluid-preserved material and another that is the primary preparation area. Two rooms off the preparation lab accommodate the dermestid beetle colony, and the large steam kettle and degreaser. The latter room is tiled and has a hoist track in the ceiling for easy movement of larger or heavy specimens.

There are 15 offices located throughout the fourth-floor range that accommodate staff, curator emeritus, research associates, visitors, and the divisional library. Three additional rooms were recently insulated and cooled for storage of skins of large mammals. We also have a large walk-in freezer.

In the past five years, loans, professionals visitors, and visitor days have trebled. Nearly 200 publications resulting from study of our specimens have been produced in this period.

Assistant Curator Timm is investigating the coevolution of burrowing mammals and their ectoparasites. Curator Emeritus Philip Hershkovitz is working on the second volume of his *Living New World Monkeys.*

*To be continued next month*

# BEHIND THE SCENES

*The Field Museum has recently received a large collection of artifactual material from Nelson Bay Cave, South Africa. Here, volunteers Mary Robertson (left) and Kathryn Daskal get instruction from Glen Cole, Field Museum's curator of prehistory, on the classification of certain of the artifacts in preparation for cataloging.*

FOR MORE THAN A MILLION YEARS human beings in Africa practiced a stone-working tradition known as Acheulian. Then, more or less abruptly, sometime between 200,000 and 100,000 years ago, this long-standing earlier tradition gave way to a very different set of stone industries of the so-called "Middle Stone Age." The nature of the change from the Acheulian to the "Middle Stone Age" is obscure.

It is not uncommon to find, in African sites, Acheulian material buried beneath deposits containing the younger "Middle Stone Age" artifacts with no suggestion of transitional phases. Few localities have been found to have stratified sequences containing artifactual material which might be regarded as transitional between the Acheulian and a particular "Middle Stone Age" industry. This situation has led to much speculation about the nature of the seemingly sudden demise of the Acheulian. Does its abrupt replacement in the stratigraphic column by "Middle Stone Age" industries indicate that more modern people bearing an advanced technology had displaced the Acheulian toolmakers?

Indeed, there is reason to suspect that this change in stone industries may eventually prove to be coincident with the disappearance of more archaic hominids (*Homo erectus*) and the appearance of *Homo sapiens* on the scene. Or could it be that the newer stone-working technology, for whatever reason, spread amongst the pre-existing human populations of Africa, replacing the older tradition so rapidly that little evidence has been retained in the archeological record? Or again, could it be that the Acheulian rather generally developed into the various regional "Middle Stone Age" industries but that this happened too quickly to permit resolution except in certain exceptional circumstances?

Glen Cole, curator of prehistory, has long been interested in such questions and has undertaken, or has participated in, several excavations in eastern Africa that relate to the problem. In recent years, some of the artifacts recovered from these excavations have been acquired by the Field Museum and are presently being cataloged. In 1956 and 1957, Dr. Cole worked with two Field Museum research associates, Dr. F. Clark Howell, now with the University of California at Berkeley, and Dr. Maxine R. Kleindienst, University of Toronto, on the Isimila Prehistoric Site in central Tanzania. Roughly half of the material collected at the Isimila site was kept in Tanzania. The remainder, until it was transferred to the Field Museum four years ago, was housed at the University of Chicago.

In 1961 and 1962, Cole, working on a National Science Foundation award, excavated at the Nsongezi Prehistoric Site on the Kagera River where it forms the border between Uganda and Tanzania. At this locality conditions of sedimentation were such that any transitional industry which might have existed should have been preserved. Acheulian artifacts were found deeply buried on what had been an ancient shoreline of Lake Victoria. The thick deposits which overlie the Acheulian horizon contain many occurrences of "Middle Stone Age" artifact aggregates. Occurrences were also found which include features suggestive of a transitional industry, but such findings tended to be under equivocal circumstances. Further investigation is called for but, unfortunately, the delicate political situation in this area in recent years has made field work there infeasible.

The Field Museum's holdings in the area of African prehistory in general had been weak before the acquisition of the large Isimila collection, and had remained so for the "Middle Stone Age." This situation was much improved by a gift from the University of Chicago in 1979: a very large quantity of well documented artifactual material from the Nelson Bay Cave site on the South African coast between Capetown and Port Elizabeth, which was excavated by Dr. Richard Klein of the University of Chicago. Several volunteers have been recruited recently to assist with the cataloging of this material. ☐

***Above:*** *Louva Calhoun, Field Museum associate, has prepared for publication a large number of illustrations of stone artifacts from the Isimila Prehistoric Site in Tanzania and is now engaged in the cataloging of that collection. Here she is drawing a stone tool for its catalog card.* ***Below:*** *Glen Cole examines a quartzite tool which he excavated at the Nsongezi site in Uganda. The Field Museum received from the Oregon State Museum of Anthropology in 1979 a small collection of Nsongezi artifacts, which are now being cataloged.*

# THE TIPI

## A Cultural Interpretation Of Its Design

*By Terry Straus*

The house form of the nomadic tribes of the American Great Plains was the tipi; the native horticulturalists of the eastern plains also used the tipi when they left their earth lodge villages to hunt the buffalo, especially in the summer months. Details of the tipis varied from tribe to tribe, but it was essentially a skin tent consisting of a conical pole framework built on a base of either three or four "foundation poles" bound together several feet from the top with rawhide. The cover of the tipi consisted essentially of 8 to 12 tanned buffalo hides sewn together with sinew. The cover was wrapped around the frame from the back, and the front seam fastened above the entrance with pins of wood or bone. The entrance itself was covered with a rawhide door. Stones secured the tipi cover at the ground, and flaps sewn to the cover by the smoke hole at the top were attached to long poles by which they were opened or closed. In contemporary tipis, canvas replaces the buffalo hides and nylon thread replaces the sinew, but the design and construction is otherwise the same.

The tipi was remarkably well adapted to the plains environment and to the nomadic, buffalo-hunting lifeway of its inhabitants. In design, its curving lines helped the tipi withstand the typically high winds when other structures suffered damage. With prevailing winds from the west, the tipi entrance was always to the east, maximizing protection. The tipi was warm in the winter and cool in the summer. An interior lining of buffalo hides tied to the poles provided excellent insulation in the coldest months, and the central fire uniformly heated the living space and provided for cooking.

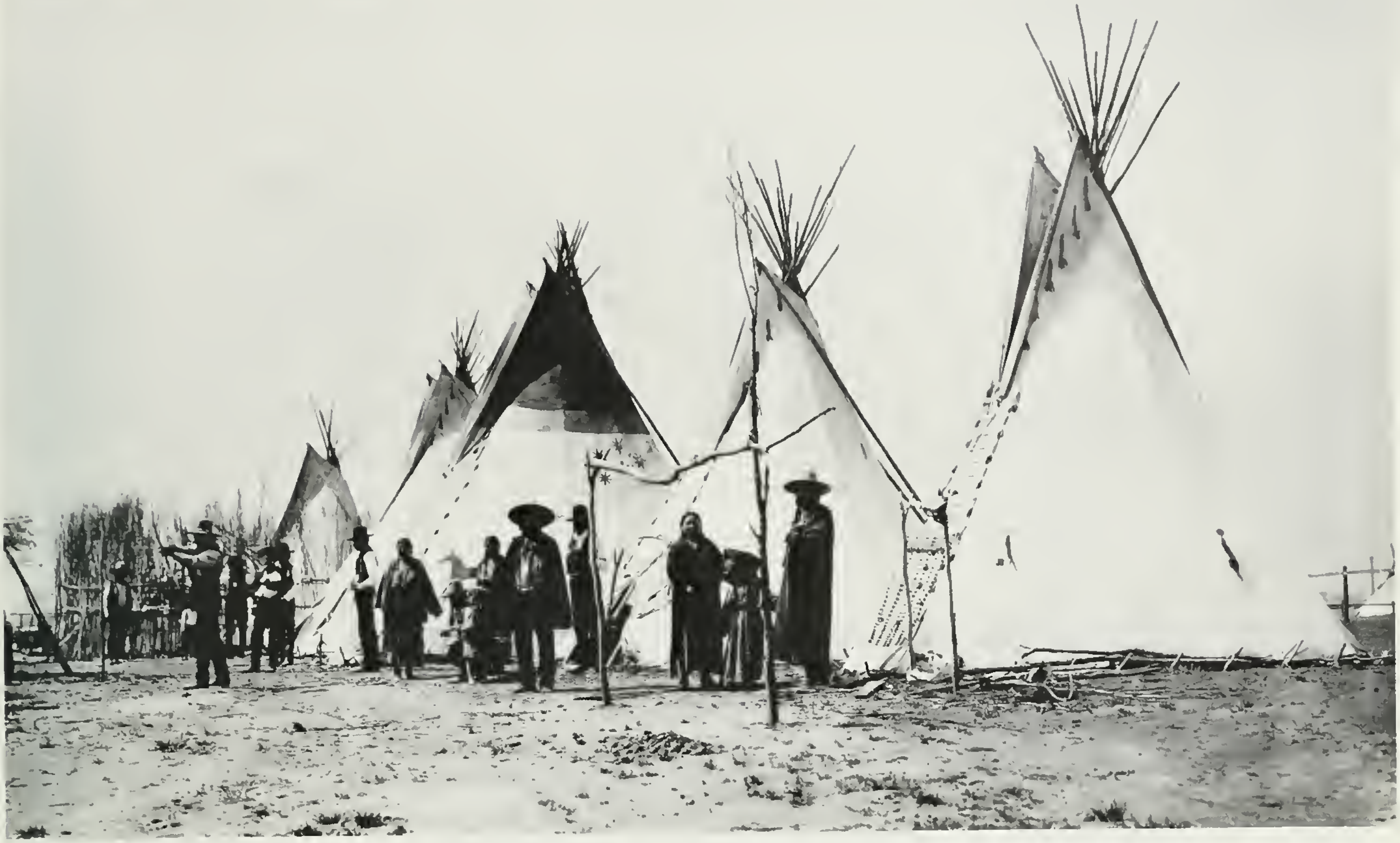
The smoke hole above the fireplace at the front part of the tipi top allowed the smoke to escape (cottonwood logs, which created the least smoke, were preferred). The smoke hole could be covered by the large flaps sewn next to it for protection from rain or snow and those same flaps served as windbreaks for the interior of the dwelling when they were raised. The cover itself was partially waterproofed at the top by the smoke, which left a protective coating around the smoke hole.

In the summer, women cooked outside and removed the insulating cover from the inside of the tipi. They also removed the stones and rolled up the bottom of the tipi cover, allowing air to circulate through the structure; the open smoke hole also provided for circulation in the summer months. The whole tipi could be rapidly disassembled, was lightweight and easily transportable. As with the rest of High Plains material culture, there were no fragile parts, everything travelled well. The cedar poles were transported as well as the cover (which was easily folded and packed for travel), since wood was so scarce in the plains. The poles were bound together at one end and secured across the back of a horse, thus forming the *travois*, which carried the tipi cover, personal belongings, and often children or the elderly from camp to camp.

The functional utility and environmental fit of the tipi are indeed impressive. But, like the earth lodge, this Plains Indian home did more than shelter its inhabitants; it provided them with a domestic space which both reflected and taught about the larger world, thus offering a secure refuge in which to prepare for and regroup from life in that world.

*Cheyenne tipi with paintings depicting special events in family history.*

*Dr. Terry Straus teaches Native American Studies at the University of Illinois, Chicago Circle Campus.*



Painted and decorated Arapaho tipis, on site of St. Louis World's Fair of 1904.

The ground plan of the tipi is circular, circumscribing a space consistent with everything its inhabitants know and feel about the world. As Lame Deer, a Siouan medicine man, explained:

> Nature wants things to be round. The bodies of human beings and animals have no corners. With us the circle stands for the togetherness of people who sit with one another around a campfire, relatives and friends united in peace while the pipe passes from hand to hand. The camp in which every tipi had its place was also a ring. The tipi was a ring in which people sat in a circle and all the families in the village were in turn circles within a larger circle, part of the larger hoop which was the seven campfires of the Sioux, representing one nation. The nation was only a part of the universe, in itself circular and made of the earth, which is round, of the sun, which is round, of the stars, which are round. The moon, the horizon, the rainbow — circles within circles, with no beginning and no end. To us this is beautiful and fitting, symbol and reality at the same time, expressing the harmony of life and nature. Our circle is timeless, flowing: it is new life emerging from death — life winning out over death.*

The tipi circle enhances the solidarity of the family within, setting it off from everything outside the circle. Within the circle is security, meaning, order, and power; outside there is only being lost. The center holds the circle together, the central fire holds the family together. The center is understood to be specially powerful and must be respected. The power of the center, of the fire, is such that one must not sleep with his head or feet pointing towards it; it may overwhelm him: ("You will get a headache if you sleep that way.") The special relationship of each individual to the fire, the domestic center, must be respected; one must not pass between the fire and an individual who is smoking/praying in the tipi. The fire is the focus of these prayers, carrying them up in its smoke through the smoke hole to the Above World and the spirit persons which inhabit it. Each individual, whether he stands, sits, or sleeps on the circumference of the domestic circle, shares that fire as his "center," his heart, his focus.

As Lame Deer, the Siouan Medicine man, makes very clear, the circle has/is motion. It is "with no beginning and no end . . . flowing . . . new life emerging from death." The flow follows the sun, beginning in the east and proceeding

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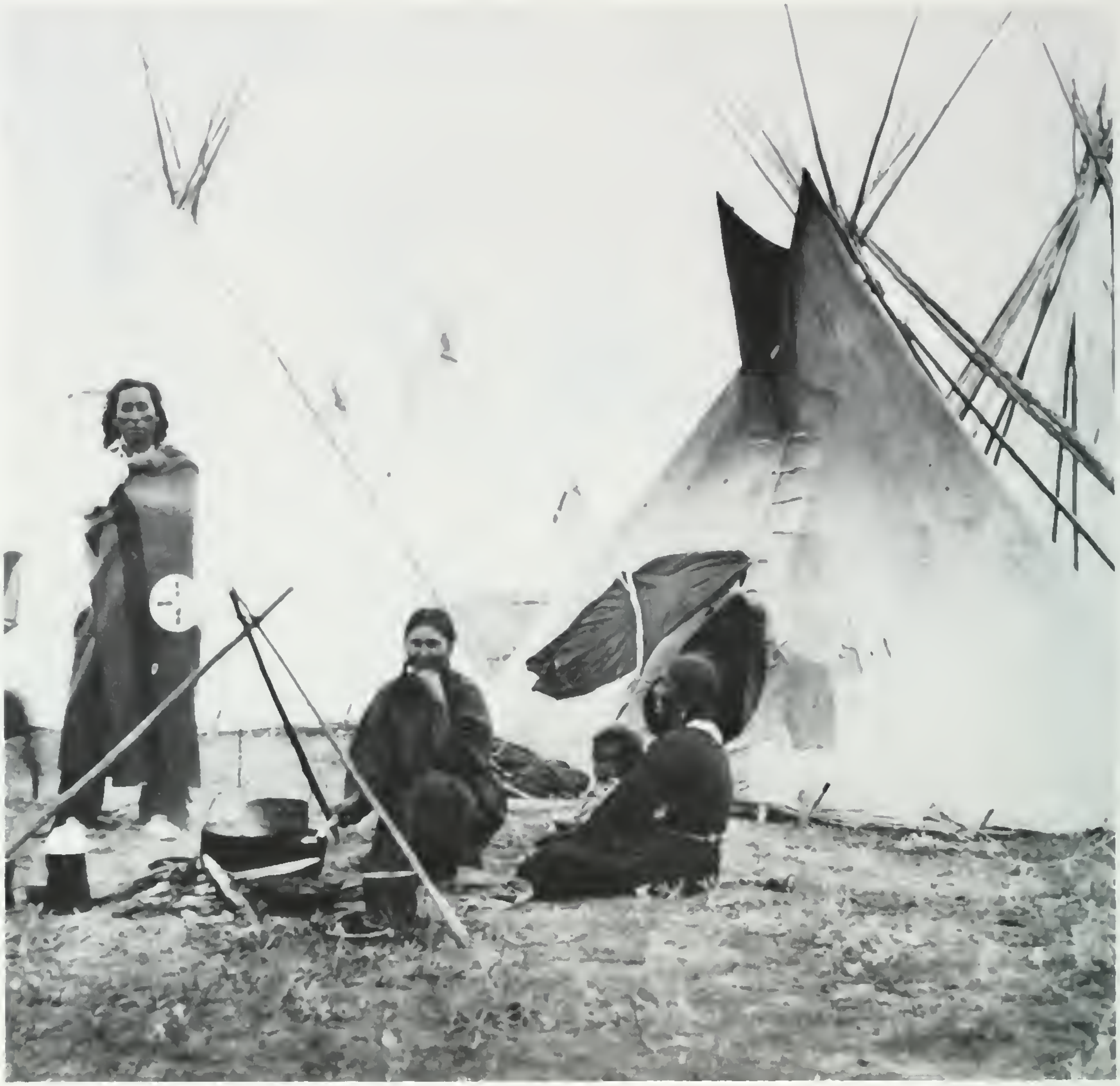
**Lame Deer*, Lame Deer, Seeker of Visions *(New York, Simon & Schuster, 1976), p. 100.*

*Unpainted Assiniboine tipis including one without cover. Decorative medallion on man's trade blanket shows circular motif and cross symbolizing the four directions.*



clockwise, "sunwise" to the south, the west, the north, and returning again to the east to begin a new cycle. Just as winter follows the fall, so the rejuvenation of spring follows the winter, "life emerging from death, life winning out over death." As with the seasons, the days and life itself, time, which is the rhythm of these things, is cyclical, nonprogressive, and in this way, "timeless."

In this view of life, the very old and the very young have a special relationship, and there is a strong unarticulated sense of generational and sometimes individual reincarnation. Sleeping arrangements in the tipi reflect the contiguity of very old and very young. The youngest properly slept with their mothers near the door of the tipi — in the east, place of dawn, of newness, while the oldest slept towards the north, representing their relationship both to the mature adulthood of the lodge head (and his favorite wife), who slept to the west in the honored place of the tipi, and to the new life which developed again in the east; old and young were spatially linked as they were understood to be linked in the cycle of life as defined in Plains culture.

The Four Directions were symbolically associated with the seasons, the days, the stages of life, the quadrants of the body, the qualities of individuals, the colors of the earth. They provided the sacred, primal, and essential organization of the world in Plains culture — that which, in their creation stories, makes order out of chaos, culture out of nature. Four is the "magic number" into which all things seem naturally and properly divided. Virtually all domains of Plains life can be seen to reflect this fourfold order of things:

> In former times the Lakota grouped all their activities by fours. This was because they recognized four directions: the west, the north, the east, and the south; four divisions of time: the day, the night, the moon, and the year; four parts in everything that grows from the

ground: the roots, the stem, the leaves, and the fruit; four kinds of things that breathe: those that crawl, those that fly, those that walk on four legs, and those that walk on two legs; four things above the world: the sun, the moon, the sky, and the stars; four kinds of gods: the great, the associates of the great, the gods below them, and the spiritkind; four periods of human life: babyhood, childhood, adulthood, and old age; and finally, mankind has four fingers on each hand, four toes on each foot and the thumbs and the great toes taken together form four. Since the Great Spirit caused everything to be in fours, mankind should do everything possible in fours.*

This plan must be seen to reflect the design of the medicine wheel which, outlined in stones on the sacred mountain, defined the world; it also outlined the actual path of the vision seeker, directing his prayers towards each of the Four Directions, beginning in the east, in his effort to gain insight into the great circle of being. The medicine wheel with the symbolic associations suggested above may be understood as a sort of "master symbol" of Plains Indian culture, summarizing Plains Indian world view and revealing the proper order of things as defined in Plains Indian culture. The ground plan of the tipi is clearly neither accidental nor purely functional; it feels right to its inhabitants because it is in harmony with the world as they have come to know it.

The tipi as a whole is sometimes associated with the human body, domestic space and personal space being intimately linked. The support poles may be referred to as its "backbone," the flaps as its "ears." The body is most commonly conceptualized as female: women own tipis, domestic space is woman's space, and the tipi itself may be seen to resemble a woman in the native position for childbirth, arms outstretched to clutch two upright poles, her dress (made from a hide formerly part of a tipi cover) covering her squatting body, the new life emerging through the entrance from within her. But contemporary artists such as Richard West (Cheyenne) suggest a relationship as well between the form of the tipi and the figure of a man, arms outstretched in prayer.

The triangular form of the tipi is symbolically associated with mountains, which themselves are represented by triangles in geometric designs beaded or quilled by the women. The height of a mountain brings it in closer contact with the Above World and makes it a good place to go to seek guidance from those powerful persons who inhabit the Above World. The smoke hole of the tipi, like the apex of the symbolic mountain, is the closest place in this world to the "reflected world" beyond; indeed, it may provide a kind of fulcrum for that reflection. Situated above the central fire, itself a focus of power within the tipi, the smoke hole is the intersection of the prayers/ smoke going up and the blessings coming down from the Above Persons (analogous in this way to the crotch of the center pole in the Sun Dance lodge). The apex of the tipi is a common locus of visions in ceremonies held within the tipi.

The location of tipis within a camp further explicates the symbolic associations, the meanings of spatial arrangements in Plains culture. In the old days, the whole tribe came together only for a few months during the summer; for the rest of the year families scattered into bands of close relatives and friends, following the buffalo which also dispersed in search of grass. When the tribe camped together, the plan of the camp mirrored the ground plan of the individual tipi.

In the center was a large ceremonial hut and/or tribal fire, represented in purely social gatherings today by the pow-wow arbor. To the west — place of honor — the tipi which held the sacred tribal objects was located along with the tipis of the keepers of those objects. The entrance to the camp was an opening to the east, and ritual motion within the camp circle (the herald riding around with the news of the day, for example) was all clockwise, sunwise, from east to south to west to north. Within the circle, the separate bands of the tribe tended to camp together, maintaining the same relative position year after year, and individual family tipis could be recognized by position as well as by identifying designs or stories painted on their covers. The whole tribe, thus arrayed, formed a kind of huge tipi. The members think and speak of themselves as a unit, a family, and the spatial arrangement contributes to that feeling of kinship and solidarity. It is no great surprise that such camps en-

*Sioux tipis, with wagons, which replaced the* travois.

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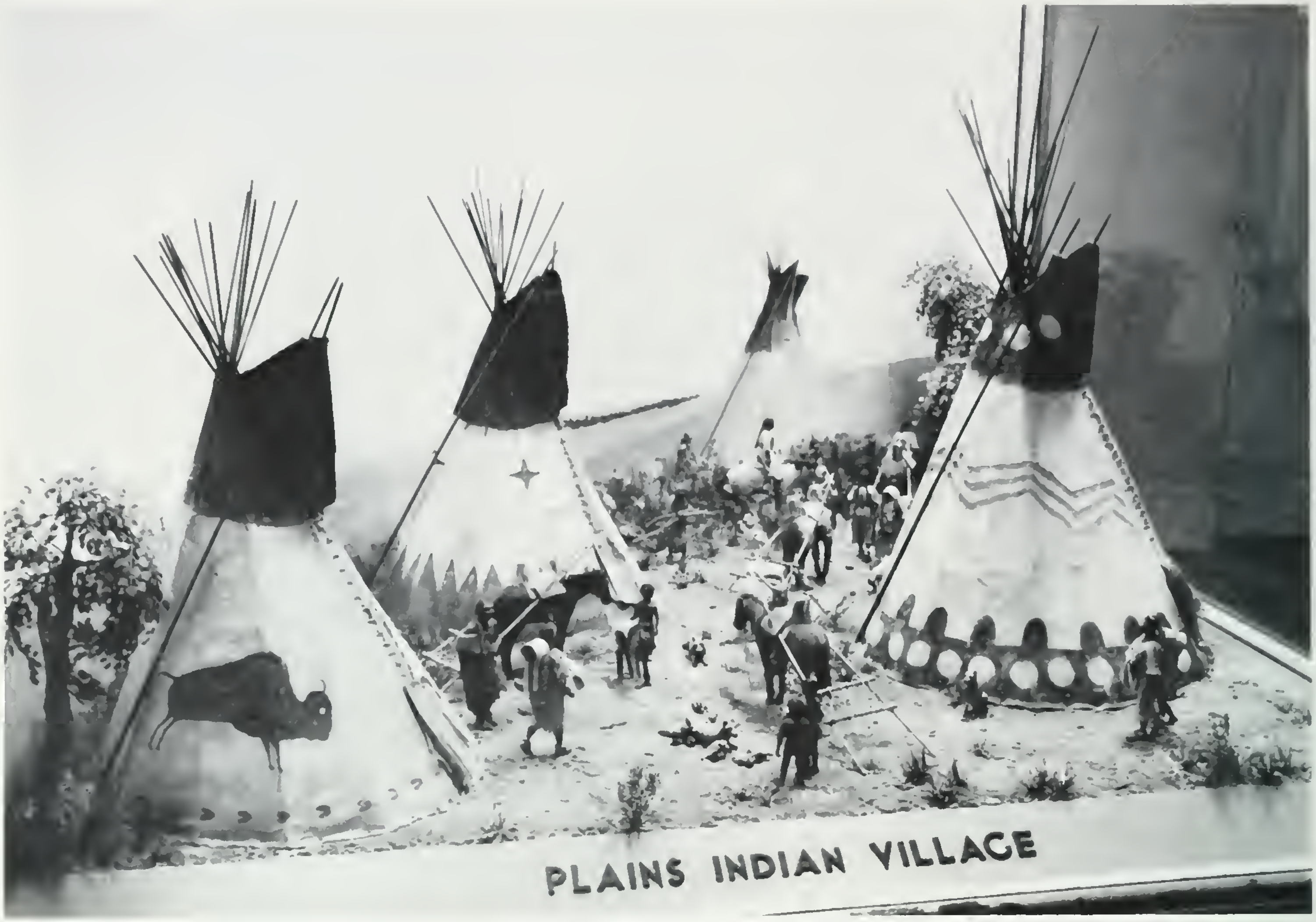
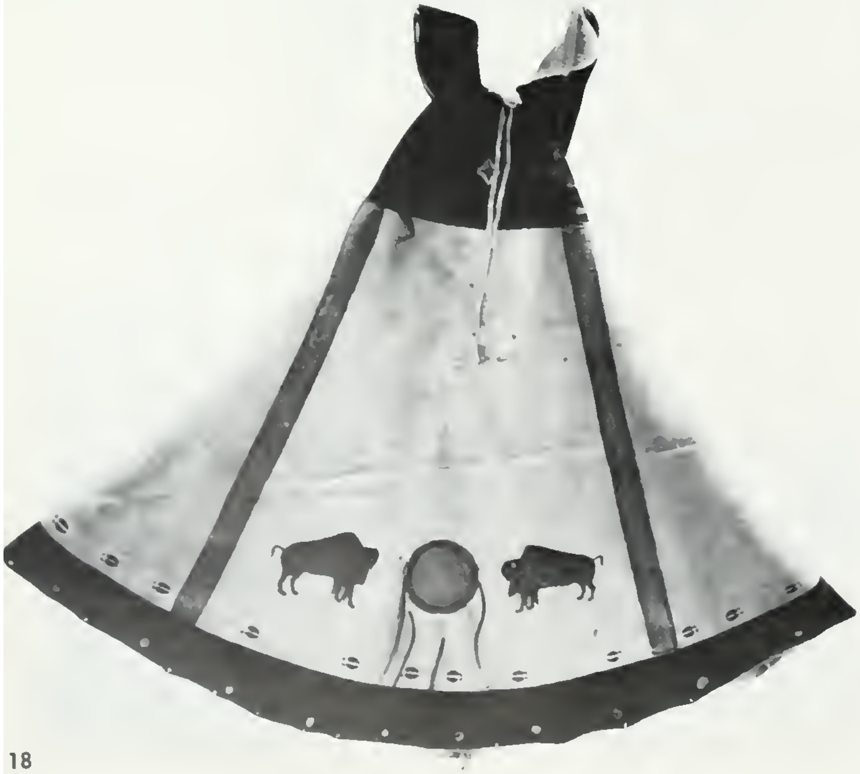
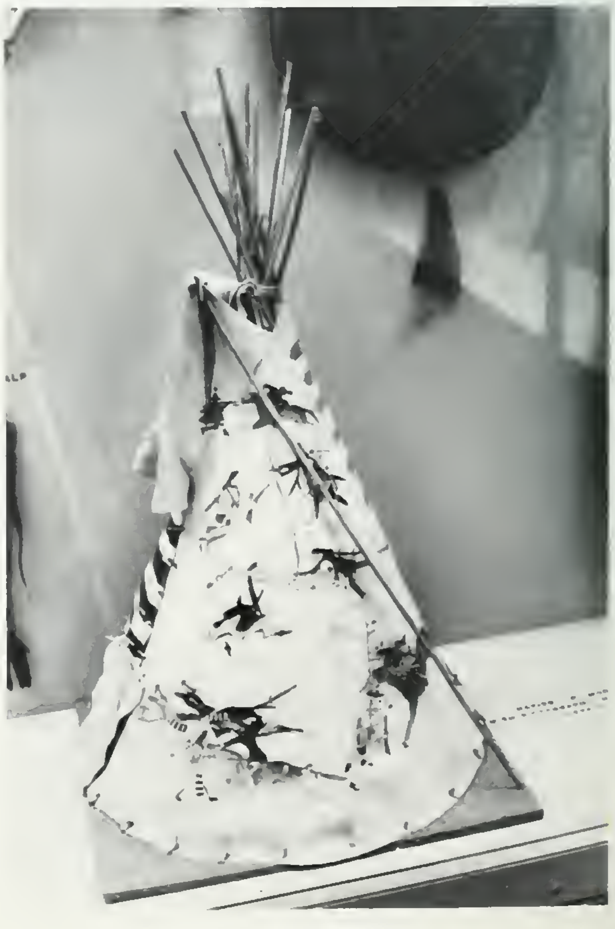
*J. R. Walker, "Oglala Metaphysics," Dennis and Barbara Tedlock, eds.,* Teachings from the American Earth *(New York, Liveright, 1975), p. 215.*



*Tipi models in Hall 6. Above: Plains Indian village; below, left: buffalo-hide model made by Cheyenne; below, right: model made by Cheyenne, with pictographs of battle scenes.*





couraged tribal feeling and emboldened young warriors before major battles.

The Plains Indian tipi, in its plan, orientation, and location, supports and informs the order of things as they are understood in the Plains Indian way. Public and ceremonial structures — the sweat lodge, the Sun Dance lodge, and the summer pow-wow arbor, for example — can similarly be seen to reflect native cosmology. The same arrangements of space recur continually throughout Plains Indian life. These arrangements teach about the order of the world, reflect the organization of the cosmos, and support the position of the individual within the tribal community. The elements of organization of the tipi are the elements of all organization in the Plains Indian world, the arrangements deemed necessary to consistency, harmony, and adjustment within the cosmos.

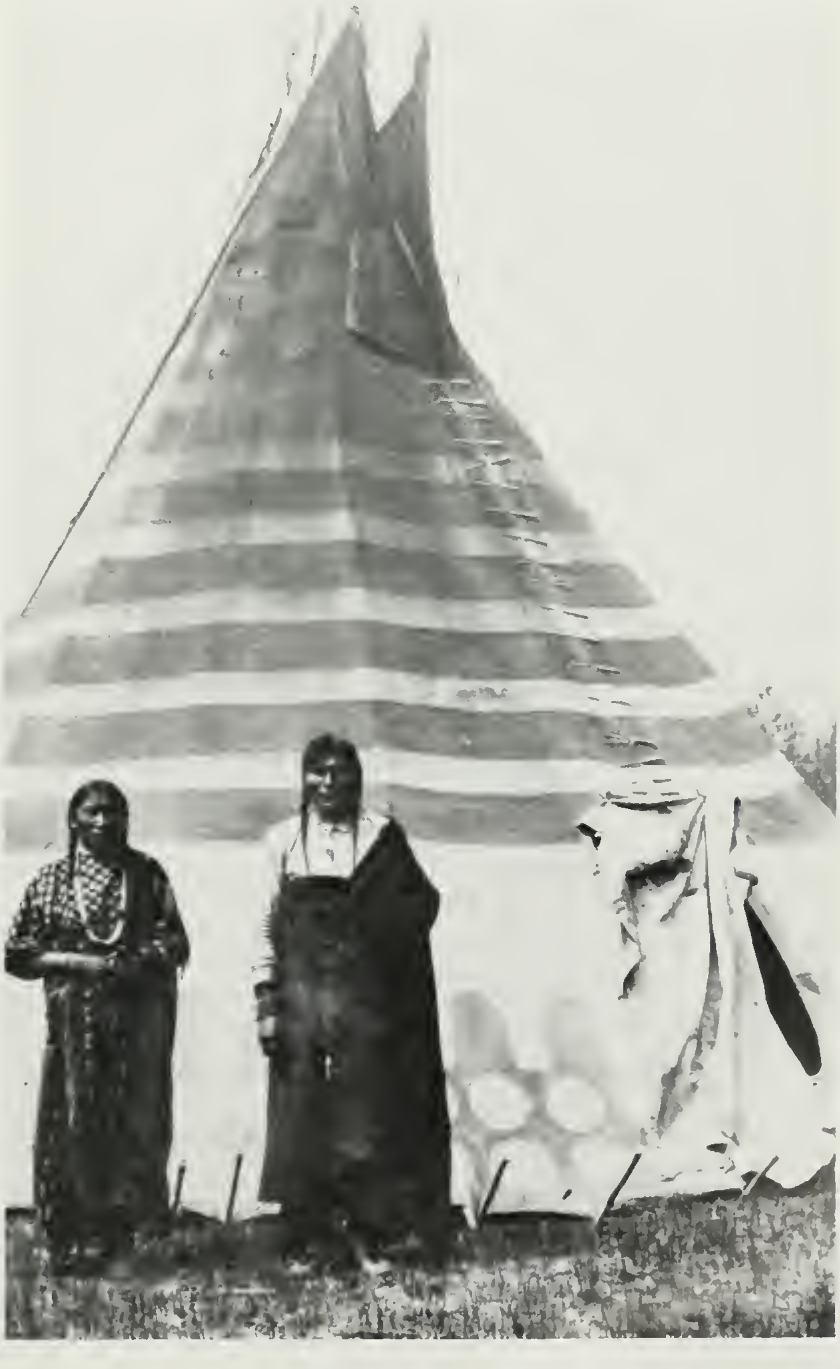
The cultural constitution of architectural space within the tipi is poignantly reflected in one Northern Cheyenne woman's view of the changes imposed upon her people by federal aid and regulation of reservation homes. She speaks of three main stages of domestic architecture on the reservation: native tipis, one-room log houses, and multiroomed plank houses.

The first changes came slowly. When, in the early reservation days, a Northern Cheyenne agent suggested the rectangular, one-room log house as an alternative and an improvement upon the native tipi, the only person who could be persuaded to try it was a chief who used the sample log structure to house his horse. Eventually, however, as the buffalo disappeared and the lifeway changed, the sedentary log house became predominant on the reservation. Many such houses remain in use today on the Northern Cheyenne and other reservations in the Plains as well as elsewhere throughout the country.

The log house presented certain functional problems. It was hot in the summer and cold in the winter, lacking the perquisites of the tipi to adjust to the seasonal changes. Whereas the tipi had an internal insulating sheet for cold weather, the log house was hard to insulate, though many tried to solve the problem by stuffing newspapers in the ceiling and the cracks. Wind whistled through the cracks in the wall mortar and the roof leaked. Moreover, the house was small; the tipi had allowed more people to live together comfortably and without the sense of crowding that became so evident in the log house. The reduced height of the log house made its inhabitants feel further hemmed in—"boxed" in rectangular space, as it were.

But there were other kinds of problems with the log house as well: it simply didn't *feel* right. It had no center, no common focus from which each inhabitant was equidistant and equally related. Though it enclosed a domestic group it was improper domestic space; there were parts of the dwelling, with its angular borders, which could not be accommodated within a circle. The orientation towards the Four Directions was often ignored in favor of orientations towards "streets" or paths deemed necessary by the agents, and there was no height and no high point, no apex to lift prayers up and to funnel blessings down from the Spirits Above. The log house was out of sync with the rest of the world and the home was no longer supportive, restorative in its organization.

Inside the log house, even today, native efforts to reproduce the feeling of the tipi are clear. The stove is always in the center of the



*Painted canvas tipi (Blackfoot), showing smoke flaps, bone pins securing front seam, and wooden pegs holding tipi cover to ground.*

*Crow tipi showing rope (left) used to secure cover to foundation poles in back.*

structure, the chimney extending through the roof at its highest point. Around the stove, along the perimeter of the house, are the beds; and the corners, outside the domestic circle but inside the house, may serve as storage spaces. There is an apparent effort to forge circular domestic space out of the angular architectural form; but the full power of the circle as expressed in the dwelling itself has been lost.

Although with the log house domestic space came to resemble that of the white homesteaders, it did retain Indian organization and it did allow for the maintenance of family cohesiveness. At night, the old people, crowded into their cabins with the others, could still tell their stories and share their experiences within the domestic unit. There were no paintings on the walls of the cabin to proclaim family history, but that history was still told and retold and tribal traditions were similarly repeated and explained. In the next stage even this was lost, and the new house is understood as at least partially responsible for, partially a sign of, the ultimate decline in tribal traditions.

Mass-produced federal prefabricated housing eventually replaced many of the log houses on this and other reservations. The Bureau of Indian Affairs house, following federal design and values, "improved" upon the log house primarily through room division and increase in size; privacy was understood to be essential to domestic planning. This plank house has itself gone through several changes. Indoor plumbing and propane heating have been added in most cases. But the division of separate bedrooms, kitchen, and living room is common to them all. The home thus provided for a family divided and a family divided proved a poor unit for the transmission of cultural and personal heritage. Stories told at night by the old people could not be shared in the same way, and often were not even heard by the young ones in their separate room, asleep before the rest. There was no way to create a center, a focus to hold them together and provide direction and security to the individual members. Interestingly, in times of family crisis or distress, family members commonly abandon their private sleeping quarters, preferring to sleep together in the main room on couches, chairs, or even the floor. The old arrangement still gives the most support and is revived in troubled times.

The division of the family home accompanied and supported the decline of tradition in the view of at least one Northern Cheyenne woman, and her view is important in that it expresses the feeling of many that the imposed architecture was inappropriate to the Cheyenne/Plains world. It was uncomfortable for its inhabitants and could not provide the traditional support which the tipi had brought them.

For the inhabitants of the tipi, which remained the preferred dwelling at ceremonies and social dances today, the home is a kind of microcosm, a representation of the order of the macrocosmic world. Traditional architectural design reflected native cosmology; it also taught it. In design, orientation, placement, and even decoration, the tipi, like the earth lodge, revealed to its inhabitants important things about the cosmos and about their own lives. The disruption of traditional architecture exacerbated a feeling of displacement and despair.

The relationship between architectural design and world view — the symbolic association and analogies, are perhaps more obvious in small-scale societies; but, however complex, these associations are also evident in contemporary urban America. Architectural design does not develop in a vacuum; it is guided by cultural valuation and in turn communicates that valuation to the individuals who live in and around it.

# Receptaculitids: Organisms that Perished a Quarter-Billion Years Ago Are Studied by Visiting Scientist

ADVANCES IN SCIENCE sometimes seem to occur in small jumps, unnoticed at first but recognized later when history appears shortened in perspective. When viewed from the present, such individual jumps added together appear revolutionary; however, at their conception they are nothing but hypotheses proposed to best explain events. The study of growth in extinct organisms fits well into this category.

For more than 15 years Professor Siegfried Rietschel, director of the State Natural History Museum in Karlsruhe, Germany, has been engaged in the patient examination of the nature and growth of receptaculitids, organisms that spanned almost a quarter-billion years of the Phanerozoic (that part of geologic time represented by rocks in which the evidence of life is abundant). They became extinct some 250 million years ago and are still of uncertain biological affinities. Field Museum's collection of these very ancient organisms is the world's largest, both in the number of specimens as well as in geographic coverage.

The deciphering of the growth pattern of receptaculitids required a construction of a model in which the prevailing interpretation of the nature of these fossils was entirely reversed. Instead of considering them animals, Rietschel proposes that they were plants; they ceased to move and became capable of photosynthesis! Many subsequent additional small jumps were made: the interpretation of the ecology of receptaculitids, the discovery of the nature of their skeletons, the attempts to formulate the system of classification; but above all else the history of plant life was greatly enlarged, and the gap in the knowledge was substantially filled.

Today, research on the growth of receptaculitids, thanks to Rietschel, is highly rated, and the excitement of this work is second to none. Professor Rietschel's study on such diverse organisms as algae, sponges, conodonts, and Archeopteryx, the first bird, may be regarded as additional jumps in what is now a well known interpretation. His recent paper on receptaculitids is an impressive contribution, with numerous technical drawings and charts, and it forms the basis of many other important research problems in evolutionary biology. The paper is not easy reading, because of the new scientific terminology that Rietschel had to invent; nevertheless, it is intellectually rewarding.

Dr. Rietschel is now at the Field Museum as a visiting scientist in the Department of Geology, where I am participating with him in his analysis of the growth of fossil organisms. From this scientific camaraderie is emerging an understanding of one of the most fascinating fossils in the fossil record. The knowledge of previously unrecognized plants will, when completed, provide insight into many secrets of the evolution of life and of life communities and their growth.

*—Matthew H. Nitecki*
*Curator of Invertebrates*

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*Dr. Siegfried Rietschel's research at Field Museum is under provisions of the Visiting Scientist Program, initiated in 1979. The program sponsored two scientists in 1979 and eight in 1980, including five from U.S. institutions, one from Canada, one from France, and one from England.*

*Siegfried Rietschel*

# Field Museum Tours for Members

## Papua New Guinea

May 1-17
Tour Price: $4,461

Papua New Guinea is unique on the face of the planet Earth. For millenia (or untold time) a diversity of contrasting cultures has flourished here within small areas because of the isolation imposed by rugged terrain of mountains and jungles, and because of hostilities between the many different peoples. Largely unknown to each other and to the outside world they coexisted, each in a communal environment sufficient unto itself. Only since contact with modern industrial society has this isolation been broken, making it possible for visitors to explore and exclaim over the natural wonders of this Edenlike paradise.

It is one of the most remarkable—and last—reservoirs of animal, reptile, insect, and bird life to be found anywhere. But most of all, Papua New Guinea presents a variety of cultures and art of such freshness and color it holds a fascination beyond all else.

The Sepik River is a monster waterway draining a vast area of grassland, swamp, and jungle in its serpentine circuit. We will cruise the Sepik, reaching into the past in remote regions where the villagers still travel in tradition dugout canoes.

Our lecturer, Dr. Phillip Lewis, curator, primitive art and Melanesian ethnology, will escort the tour from Chicago, and share his knowledge of the varied arts and cultures of Melanesia. In addition, our Sepik director, Jeff Leversidge, a well-known personality on the Sepik and Ramu Rivers, and very knowledgeable about the diverse cultures, arts, and customs of the Sepik regions, will lecture the group during the cruise and shore excursions.

Accommodations on board the newly refurbished *Melanesian Explorer* are modern and comfortable. Passengers are housed in air-conditioned twin-bunked cabins, each with private bath.

## Peru and Bolivia: 1981

October 15-November 1
Tour Price: $3,100

A Different Experience! A Different World! From the fabulous Incas, through Spanish Colonial times to the modern cities of today—yet maintaining its Latin charm. You'll love the green fertile valleys along the sandy desert coast of Peru; the highest railroad in the world; crossing Titicaca, the world's highest navigable lake by hydrofoil; flying over the Nazca plains. Our tour includes the fascininating cities of Lima, Cuzco, Trujillo, Puno, a train trip to fabulous Machu Picchu, and four full days in La Paz.

Dr. Alan L. Kolata, visiting assistant curator of South American archeology and ethnology, and project director, Field Museum Expeditions to Bolivia, will accompany the tour members during the entire trip. Dr. Michael E. Moseley, associate curator of Middle and South American archeology and ethnology, who for the past ten years has directed large-scale projects on the north coast of Peru, will join the group when we visit his area of research.

## Kenya and the Seychelles

September 12-October 3
Tour Price: $3,750

There Is Now, as there has always been, an aura of mystery surrounding Africa — Tropical islands and the coast, endless palm-fringed beaches, snow-capped mountains on the equator, jungle primeval, sun-baked plains. They are all a part of East Africa. The wildlife . . . the stately processions of elephant and giraffe, prides of lion, the beautiful and rare leopard, the elegant cheetah, the magnificent migration of the wildebeest and zebra. Only here in East Africa is there still such diversity.

The itinerary includes a daytime stopover in London, overnights at the Nairobi Hilton, Mt. Lodge Tree Hotel, Samburu Game Lodge, Mount Kenya Safari Club, Lake Hotel (at Lake Naivasha), Governor's Camp (Masai Mara Game Reserve), and other first class accommodations. Three days in the Seychelles Islands and an overnight stay in London will conclude the trip.

Tour lecturer will be Audrey Faden, a native Kenyan, who formerly served as Officer in Charge of Education at the National Museum of Kenya, Nairobi.

## Illinois Archeology

May 31-June 5

For the third consecutive year Field Museum is offering an archeological field trip which will visit Dickson Mounds, Kampsville, and Cahokia Mounds. Limited to 30 participants, the trip includes site visits, lecture and slide presentations, workshops and discussions led by staff archeologists working at the respective sites. The field trip director is Robert Pickering, anthropologist and archeologist who led the 1979 and 1980 field trips.

FIELD
MUSEUM
TOURS

*For itineraries, brochures, or general tour information, please call the Tour Office, 322-8862, or write Dorothy Roder, Field Museum Tours, Roosevelt Road at Lake Shore Drive, Chicago, IL 60605.*

# Reception Honors 1980 Volunteers

The 1980 Volunteer Recognition Reception, held on February 18, 1981, hosted volunteers, staff, and their guests to a lively evening of cocktails and a buffet dinner. Preceding the award-giving, the chairman of the board, Mr. William G. Swartchild, Jr., and the president, Mr. E. Leland Webber, spoke of the valuable contributions made by volunteers to Field Museum. The director, Dr. Lorin I. Nevling, Jr., then honored those volunteers with 500 hours or more and personally presented them with individual gifts, tokens of our appreciation for their work. A short program prepared by staff presented a review of Field Museum animals on parade. Volunteer Coordinator Victoria Grigelaitis, concluded the program with comments on the impact of volunteer work throughout the entire Museum. The remaining gifts were then distributed to the volunteers.

This yearly event acknowledged the 43,343 hours contributed by 290 volunteers who worked throughout the Museum in a great variety of capacities. They assisted with collection maintenance, specimen preparation, library activities, scientific research projects, conducted educational programs seven days a week, identified uncataloged specimens, photographed, typed, and performed other diversified work.

Additional hours were earned by the temporary exhibit volunteers. Sixty volunteers contributed 3,084 hours to "The Gold of El Dorado" exhibit, and 105 volunteers added 5,011 hours for "The Great Bronze Age of China." The Museum was the recipient of a total of 51,438 hours, which translates into the equivalent of 25 full-time staff persons. These hours reflect a tangible community commitment to the Museum. The 1980 Volunteer Recognition Reception acknowledges the volunteers who so substantially gave of their time, energy, and skills toward the realization of Field Museum's goals.

## Special Recognition

### Over 500 Hours

Lorna Gonzales (967 hours): *Education;* conducted English and Spanish programs on geology and anthropology to school groups; assisted with Summer Fun, Winter Fun, and Kroc Field Trips; assisted with visitor services with "The Gold of El Dorado" and "The Great Bronze Age of China" exhibits.

James Swartchild (759 hours): *Anthropology;* photographed specimens.

Roger Larson *(664 hours): *Administration;* interim Museum Shop manager; reviewed, analyzed grant-related and other special projects.

Connie Crane (622 hours): *Anthropology;* did research for the Northwest Coast Project (Hall 10).

Llois Stein (614 hours): *Anthropology;* researched and cataloged collection from Biah Islands, Irian Saya (Dutch New Guinea).

Sol Century (612 hours): *Anthropology;* accessioned and cataloged in general projects in Asian Division.

David Weiss (585 hours): *Anthropology;* administrative assistant in Asian Division; responsible for overseeing loans; miscellaneous correspondence, special projects.

Carolyn Moore (584 hours): *Anthropology;* special projects researcher in Asian Division.

Frank Greene, Jr. (581 hours): *Geology;* collected Mazon Creek specimens, keeping records of their distribution in the field.

James Burd (544 hours): *Anthropology;* accessioned and cataloged in general departmental projects in Asian Division.

Peter Gayford (543 hours): *Anthropology;* administrative assistant in Middle Eastern Archeology; assisted in study and organization of Egyptian predynastic and Old Kingdom artifacts.

Carol Landow (543 hours): *Education;* instructed school groups and Museum visitors in Place for Wonder; introduced innovative teaching methods; (winner of Chicago's 1980 Volunteer Service Award for "Outstanding Volunteer" in the area of Cultural Arts).

Margaret Martling (500 hours): *Botany;* organized collections in botany library; assisted with indices for publications.

### Over 400 Hours

John Bayalis*: *Botany* and *Photography;* pulled botany negatives and prints, printed them; general photography printing.

William Bentley: *Anthropology;* photographed artifacts in Asian Anthropology.

Halina Goldsmith: *Education;* conducted programs for school groups and visitors in Place For Wonder; assisted with visitor services for "The Gold of El Dorado" and "The Great Bronze Age of China" exhibits.

Steve Sroka: *Geology;* curated Mazon Creek bivalves; consolidated and identified uncataloged material.

Patricia Talbot: *Geology;* enlarged photographs of fossils in geology darkroom for forthcoming book; did library bibliographic references.

Robbie Webber: *Anthropology;* researched effects of plate tectonics on precolumbian peoples in Peru; indexed, edited articles, compiled material for articles in preparation.

### Over 300 Hours

Dennis Bara: *Membership;* weekend membership representative.

Louise Brown: *Botany;* bibliographic work, assisted curator with preparation of liverworts for herbarium.

Sophie Ann Brunner: *Zoology;* Amphibians and Reptiles; skinned, skeletonized, labeled and boxed specimens.

Louva Calhoun: *Anthropology;* cataloged Acheulian artifacts from prehistoric site in Tanzania; numbered, measured, and made drawings of the specimens.

James Currey: *Zoology;* Mammals; skinned, fleshed specimens.

Evelyn Gottlieb: *Education;* conducted Weekend Discovery tours, assisted with visitor services with "The Gold of El Dorado" and "The Great Bronze Age of China" exhibits.

**Deceased*

# 1980 Volunteers
# Over 300 Hours

Cecily Gregory: *Geology;* inventoried Sedimentary Rock, General Geology and Economic Geology collections; cataloged specimens.

Sol Gurewitz: *Anthropology;* curatorial assistant, photographer in Asian Anthropology.

Claxton Howard: *Library;* filed records and correspondence; typed and shelved materials.

Shirley Kennedy: *Education;* conducted programs for school groups and visitors in Pawnee Earth Lodge; assisted with visitor services with "The Gold of El Dorado" and "The Great Bronze Age of China" exhibits.

Anne Leonard: *Anthropology;* co-curated "Patterns of Paradise" exhibit, and the catalog, and label copy; worked on photographic records and prepared exhibit for shipment.

Withrow Meeker: *Anthropology;* prepared loan specimens; special projects in Asian Division.

Norman Nelson: *Administration;* diversified projects involving physical plant.

Louise Neuert: *Anthropology;* retrieved and cleaned specimens, made costume mounts in Northwest Coast project (Hall 10). *Education;* information services assistant for "The Gold of El Dorado" exhibit.

Ernest Newton: *Anthropology;* photographed artifacts in Asian Division.

Gary Ossewaarde: *Education;* conducted, researched Weekend Discovery tours in anthropology and geology; introduced Weekend Discovery film features.

Elizabeth Rada: *Botany;* typed and edited cryptogamic manuscripts for publication.

Helen Ruch: *Building Operations;* cared for and maintained living plants in Museum.

James Skorcz: *Library;* helped fill interlibrary loan requests from outside libraries, filed cards in catalog, compiled statistics, special projects.

Lorain Stephens: *Zoology;* Birds; prepared manuscript for a series of "Ornithological Gazetteers of South America," completed the gazetteer for Peru.

## 1980 Volunteers

Laura Abou-Shaaban
Bruce Ahlborn
John Ahrens
Victor Algmin
Carrie Anderson
Cleo Anderson
Robert Anderson
Dolores Arbanas
Judy Armstrong
Harry Ault
Beverly Baker
Dennis Bara
Lucia Barba
Gwen Barnett
Sanda Bauer
Dodie Baumgarten
John Bayalis
Martha Bays
Virginia Beatty
Marvin Benjamin
Phoebe Bentley
William Bentley
Patricia Bercher
Robin Berkson
Ruth Blazina
Riva Blechman
Sharon Boemmel
Doris Bohl
Idessie Bowens
Hermann Bowersox
Susan Boynton
Carol Briscoe
Louise Br[illegible]n
Kathryn Briggs
Jonathan Br[illegible]
Jean Brun[illegible]
Sophie Ann Brunner
John Brzuskiew[illegible]
Rose Buchanan
Teddy Buddington
Mary Ann Bulanda
James Burd
Barbara Burkhardt
Ann Butterfield
[illegible]oun
Robert Cantu
Cathe Casperson
Sol Century
June Chomsky
Linden Chubin
Margaret Chung
Ilona Cinis
Susan Cohen
Lillian Comstock
Judith Cottle
Connie Crane
William Crowe
Velta Cukers
Jim Currey
Eleanor DeKoven
Carol Deutsch
Marianne Diekman
Lisa Dorn
Monica Dubina
Robert Dunlavey
Stanley Dvorak
Milada Dybas
Lynn Dyer
Kathleen Early
Alice Eckley
Anne Ekman
Agatha Elmes
Adrian Esselstrom
Nancy Evans
Dervila Fennel
Vaughn Fitzgerald
[illegible] Fitzwater
G[illegible] Foreman
[illegible]rda Frank
Patricia Frank
[illegible] Frederick
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Hal[illegible] Goldsm[illegible]
Lorna G[illegible]nzale[illegible]

Ron Testa

*Pawnee Earth Lodge Volunteers (left to right): K. Urnezis, J. Nelson, A. Hagan, M. Hall, J. Sherry, V. Grigelaitis, W. Sherry.*

*Weekend Discovery Program Volunteers, left to right (back row): M. McCollam, M. Bulanda, N. Evans, G. Ossewaarde, R. Parker, C. Briscoe, J. O'Boye; (front row): V. Grigelaitis (volunteer coordinator), L. Chubin, L. Sandberg, C. Nachtrab, L. Gonzales, S. Gonzales.*

Ron Testa

Steven Gonzales
David Gordon
Judy Gordon
Helen Gornstein
Evelyn Gottlieb
Ophilia Gratz
Frank Green, Jr.
Loretta Green
Cecily Gregory
Ann Grimes
Sol Gurewitz
Diane Gutenkauf
Bernadette Guzzy
Sylvia Haag
Dorothy Haber
Charles Hadala
Michael Hall
Elizabeth Hamilton
Jim Hanson
Susan Hasse
Wally Hastings
Shirley Hattis
Jane Healy
Richard Heaps
Mary Pat Helmus
Joseph Hennessey
Patricia Heymann
Audrey Hiller
Vicki Hlavacek
April Hohol
Izabella Horvath
Claxton Howard
Ruth Howard
Adrienne Hurwitz
Lucinda Hutchison
Janet Hyde
Ellen Hyndman
Darryl Isaacson
Tom Israel
Judith Johnson
Mabel Johnson
Paul Johnson
Malcolm Jones
Dan Joyce
Carol Kacin
Carole Kamber
Elizabeth Kaplan
Dorothy Karall
Dorothy Kathan
Myrette Katz
Ruth Keller-Petitti
Shirley Kennedy
Barbara Keune
Elizabeth Kimball
Marjorie King
Dennis Kinzig
Judy Kirby
Alida Klaud
Rosemary Knapp
Carol Kopeck
Judy Kurtz
Peter Lacovara
Carol Landow
Barbara Larson
John Larson
Roger Larson
Viola Laski
Joan Lauf
Katharine Lee
Siu Min Lee
June LeFor
Marion Lehuta
Steve LeMay
Anne Leonard
Virginia Leslie
Michelle Levin
Ralph Lowell
Mark McCollam
Dorothea McGivney
Edna MacQuilkin
Margaret Madel
Jean Malamud
Elizabeth Malott
Melinda Manoni
Gabby Margo
Gretchen Martin
Margaret Martling
Robert Mastej
Joel Matek
Joyce Matuszewich
Karon Maupin
Joan Maynard
Melba Mayo
Withrow Meeker
Beverly Meyer
Laura Michalik
Judi Minter
Carolyn Moore
Sharon Morgan
Anne Murphy
Marlene Mussell
Charlita Nachtrab
Mary Naunton
Lee Neary
John Nelson
Mary Nelson
Norman Nelson
Louise Neuert
Janet Nevling
Ernest Newton
Herta Newton
Georgia Nixon
Gretchen Norton
Barbara Novak
Ila Nuccio
Janis O'Boye
Joan Opila
Christine Oswald
Gary Ossewaarde
Anita Padnos
Ray Parker
Chris Patricoski
Cynthia Patterson
Delores Patton
Frank Paulo
Christine Pavel
Mary Ann Peruchini
Barbara Prescott
Barbara Preston
Dorothy Pryor
Nancy Puckner
Elizabeth Rada
Cindy Radtke
Karlene Ramsdell
Lee Rapp
Ernest Reed
Margaret Reidy
Sheila Reynolds
Elly Ripp
Addie Roach
Mary Robertson
Stephen Robinet
William Roder
Barbara Roob
Robert Rosberg
Susan Rosenberg
Sarah Rosenbloom
Marie Louise Rosenthal
Anne Ross
Ann Rubeck
Helen Ruch
Lenore Ruehr
Tom Salutz
Linda Sandberg
Everett Schellpfeffer
Marianne Schenker
Alice Schneider
Jacky Schneider
Sylvia Schueppert
Thelma Schwartz
Beverly Serrell
Jessie Sherrod
Judy Sherry
Jim Sipiora
James Skorcz
Eleanor Skydell
Eric Slusser
Beth Spencer
Irene Spensley
Julie Spiegel
Steve Sroka
Monica Steckenrider
Llois Stein
Lorain Stephens
Tom Dean Stuart
Marjorie Sutton
Sarah Sutton
Beatrice Swartchild
James Swartchild
Patricia Talbot
Benjamin Taylor
Jane Thain
Lorraine Thauland
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Bradley Wieland
Carol Williams
Kurt Wise
Gerda Wohl
Ron Winslow
Reeva Wolfson
Sarah Woodward
Zinette Yacker
Joseph Zeller

Ron Testa

*Director Nevling presents anthropology volunteer Carolyn Moore with gift.*

*Laurel Johnson, Division of Insects, plays the moose in "Field Museum Animals in Review."*

Ron Testa

# Kathakali

## South Indian Dance-Drama

**Friday, May 15**
**Lecture Demonstration: 10:30 a.m.**
**Evening Performance: 8:00 p.m.**

Kathakali, which originated in Kerala, a state on India's southwest coast, is an all-male theater whose performance techniques stem in part from a vigorous martial tradition. Seventeen actors bring the magic of the god's royal heroes and demon kings of ancient Indian myth to life.

Dating from the 16th century, Kathakali is truly India's most dynamic theater form. It is related to the only surviving form of classical Sanskrit drama, Kutiyattam, whose origins may date back to the second century. The extraordinary art of Kathakali lies in the eloquent telling of stories from the great Indian epics like the Ramayana and the Mahabharata through drama, song, dance, mime, and a complex language of hand gestures. Although the heroes and villains may seem super-human in their abilities and appearance, they remain distinctly human in character. The stylization of Kathakali extends from the rich costumes, elaborate make-up, and patterns of movement to characterization as every actor endeavors to recreate a traditional, designated personality type.

Clifford R. Jones

The noble, heroic, or divine character, called *paccha*, such as Rama or Krishna, has a green face with velvet black brows and red mouth. A *katti* character, evil but with a streak of nobility, has a green base with a red and white stylized moustache snarling over each cheek. The "red beard," or demonic antihero, has a black and red face and knobs on the nose and forehead. Various other details, from false breasts to holy beads, designate a panorama of personalities—demonesses, sages, apparitions, charioteers, and evil women who are "too beautiful" and therefore suspicious. The artists are allowed to subtly develop each role and interpret them individually. In fact, certain passages of Kathakali theatre are wholly improvised every time they are performed.

The musical accompaniment in Kathakali is characterized by specific *ragas* (melodic modes) and *talas* (rhythmic patterns). The lead singer also plays a *cennalam*, or gong, with which he sets the tempo. He is joined by drums and, in dramatic moments, a conch shell, or *sankhu*.

The troupe comes from an organization which has been dedicated to the preservation and presentation of Kathakali since 1930: The Kerala Kalamandalam. Their arrival for this spring tour marks the troupe's third appearance in the United States. The tour is sponsored by The Asia Society's Performing Arts Program, which is supported by grants from The Andrew W. Mellon Foundation, Mr. John Goelet, The Weatherhead Foundation, Mr. C.Y. Tung, and the World Study Museum, Kyoto. This program is partially funded by the Illinois Arts Council.

A one-hour lecture-demonstration on the art of Kathakali at 10:30 a.m. on May 15 is a basic introduction to Kathakali epic theater and describes the major characters involved in the dance dramas, dance movements and what they mean, make-up application, and costume symbolism. The lecture-demonstration is designed to enhance one's understanding of the formal evening performance. Tickets for the lecture-demonstration are $5.00; $3.00 for Museum members.

The formal evening performance takes place at 8:00 p.m. It is held in James Simpson Theater at the Museum's barrier-free West Entrance. The program is 90 minutes long, plus a 15-minute intermission. Tickets for the evening performance are $8.00; $6.00 for Museum members. We encourage you to order tickets *in advance* for this very special event. Tickets will be sold at the door on a space available basis. For further information, call 312-322-8854.

# *April and May at Field Museum*

*April 16 through May 15*

Clifford R. Jones

KATHAKALI DANCE-DRAMA

### Continuing Exhibits

HALL OF ANCIENT EGYPTIANS. To put yourself in the mood for the April 26 Egypt Film Festival (see details below), browse through Field Museum's collection of artifacts from ancient Egypt. It's one of the best in the country. The most compelling objects are of course the human and animal mummies. In the center of the hall stands the great funerary ship from Dashur, one of the best-preserved large ancient ships in existence. The superb bronze cat sacred to Bast (case 16) is an outstanding example of Egyptian animal sculpture.
Hall J, ground floor.

HALL OF ASIATIC MAMMALS. Marco Polo's sheep, with their gracefully sweeping horns, are among the first animals you encounter in this hall of fascinating habitat groups. Swamp deer stand in muddy ground, a snow leopard directs a piercing stare at visitors, and the Indian rhinoceros and the oxen of southeast Asia startle one with their great size.
Hall 17, first floor.

### New Programs

EGYPT FILM FESTIVAL: "Images of Egypt, Past and Present." Come to Field Museum for a day-long film festival devoted to the most fabled civilization the world has ever known. Immerse yourself in a culture that tried to ensure eternal life for its royalty by burying them with everything they would need in the afterlife, and compare the ancient civilization with the sharp contrasts of Egypt today. The festival will include Hollywood "mummy movies,"

*(Continued on back cover)*

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# April and May at Field Museum

*(Continued from inside cover)*

popular scientific and ethnographic films, and panel discussions with noted Egyptologists. The festival is designed for an adult audience and is not recommended for children or family groups. Tickets are $3 for Members, $5 for nonmembers, and are available for purchase in advance from the Department of Education (322-8854), or at the West Door on the day of the festival. Sunday, April 26, 10 a.m.–4:30 p.m. The Egypt Film Festival is presented in conjunction with the Learning Museum course: "Ancient Egypt: Mummies, Magic, and Love," and made possible by a grant from the National Endowment for the Humanities.

EDWARD E. AYER FILM LECTURES. These colorful programs at 2:30 p.m. on Saturdays continue through April in James Simpson Theatre. Narrated by the filmmakers themselves, the programs are recommended for adults. Admission is free at the barrier-free West Door; show membership card for priority seating. (When the theatre has reached full seating capacity, the doors will be closed by security personnel, in compliance with fire regulations.)

☐ April 18: "Lure of Alaska"
☐ April 25: "Amazon"

WEEKEND DISCOVERY PROGRAMS. Participate in a variety of free tours, demonstrations, and films every Saturday and Sunday between 11 a.m. and 3 p.m. Check the *Weekend Sheet* at Museum entrances for locations and additional programs.

Saturday, April 18: "Olympic Rain Forest" and "Slash and Burn Agriculture" film features, 1 p.m.
Saturday, April 18: "Chinese Ceramic Traditions" tour, 2 p.m.
Sunday, April 19: "Museum Highlight Tour," 2:30 p.m.
Saturday, April 25: "Happy Birthday, Mr. Audubon!" lecture and film, 12:30 p.m.
Sunday, April 26: "[illegible] Ancient Egypt" tour, 3 p.m.
Saturday, May 2: "Island of the Red Prawns" film feature, 1 p.m.
Sunday, May [illegible]: "The [illegible] Tutankhamun: Discovery and Excavation [illegible]tion, 1 p.m.
Saturday, May [illegible] F[illegible] tour, 11:30 a.m.
Saturday, May [illegible] Arms" film feature, 1 p.m.
Sunday, May 10: [illegible] Highlight [illegible]," 2 p.m.

KATHAKALI DANCE-DRAMA. An Indian art form since the 16th century, Kathakali combines music, a sung text, acting, mime, and dance with rich costumes and fantastic makeup. This immensely vital form brings to life ancient Indian epics. It is an all-male theater whose performance techniques stem in part from a vigorous martial tradition. Field Museum will present Kathakali dance-drama from the Kerala Kalamandalam in South India on Friday, May 15, 8 p.m., James Simpson Theatre. A lecture/demonstration will be given at 10:30 a.m. Tickets for the demonstration are $3 for Members, $5 for nonmembers; for the evening performance, $6 for Members, $8 for nonmembers. These may be purchased in advance from the Department of Education (322-8854) or at the West Door on the day of the event. Advance purchase is recommended; tickets may be purchased at the door on a space-available basis only.

COURSES FOR ADULTS begin the week of April 13. Explore such topics as brain evolution and language, Shiatsu, sea beasts, and pollution. The Learning Museum course, "Ancient Egypt: Mummies, Magic, and Love," will include discussion of mummy preparation, funerary cults, magic charms, and Egyptian love songs. Advance registration by mail is required. For information, call 322-8855.

RAY A. KROC ENVIRONMENTAL FIELD TRIPS. These one-day trips to local areas of ecological and biological significance will take place on weekends through May and June. Volo Bog, Mt. Forest Island, and Hickory Creek will be among the sites visited. Field-trip brochures are in the mail to members. For additional information, call 322-8854.

### Continuing Programs

VOLUNTEER OPPORTUNITIES. Individuals with scientific interests and backgrounds are needed to work in various Museum departments. Contact the Volunteer Coordinator, 922-9410, ext. 360.

APRIL AND MAY HOURS. The Museum is open from 9 a.m.–5 p.m., Saturday–Thursday (until 6 p.m., beginning May 1); 9 a.m.–9 p.m., Friday throughout the year.

THE MUSEUM LIBRARY is open weekdays 9 a.m.–4 p.m. Obtain a pass at the reception desk, main floor. Closed April 17, Good Friday.

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# IELD MUSEUM OF NATURAL HISTORY BULLETIN

May 1981

NATURAL HISTORY SURVEY
23 1981
LIBRARY

MEMBERS' NIGHTS
APRIL 30, MAY 1

**Field Museum of Natural History Bulletin**

May 1981
Vol. 52, No. 5

*Editor/Designer:* David M. Walsten
*Production:* Martha Poulter
*Calendar:* Mary Cassai
*Staff Photographer:* Ron Testa

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*Diorama of Abyssinian colobus, or guereza, monkeys* (Colobus guereza), *in Hall 22, the Hall of African Mammals. The guereza is widely distributed in the dense forests of equatorial Africa. Photo by Fleur Hales.*

*Hopi kachina.*
*Exhibit of kachinas opens June 13.*

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*Director:* Lorin I. Nevling, Jr.

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# 30th Annual Members' Nights

## April 30, May 1

**Have you ever seen a sheep shorn?** Or a tipi raised? You can at the Museum's 30th Annual Members' Nights, the behind-the-scenes view of Field Museum which will take place on Thursday, April 30, and Friday, May 1, from 6:00 to 10:00 p.m. (Third Floor opens at 7:00 p.m.)

This year, highlights from our various ethnic festivals will be featured, including a Taichi demonstration from the China festival; "Alma de Mexico," a Mexican folk dancing group from our Latin American Neighbors Day festival; and demonstrations of sheep shearing, spinning, quillworking, beadworking, and silversmithing plus a tipi-raising from our North American Indian Heritage Day festival. Other highlights include:

**Ground Floor:** Your Name in Egyptian Hieroglyphs, Sea Snakes at the Field Museum, Lots of Lizards in Jars, Gamelan Orchestra Session.

**First Floor:** Journey to the Center of the Museum; Discovery Tours, including "Stories of the Field Museum" and "China Through the Ages"; Members' Treasure Hunt.

**Second Floor:** Keeping It All Together for Putting It Back Together—cleaning and mounting of textiles and costumes from the Field Museum collection, Electronic Production of Range Maps.

**Third Floor:** Dust to Dignity: Rediscovering the Pacific, Fossils in Concretions: Coal-Age Plants and Animals of Illinois, Display of Mineral Specimens Used in Field Museum Calendar, Mount St. Helens: The Volcano that Blew Its Top, Scorpions, Centipedes, Spiders and Other Venomous Creatures, How Plants Get Their Latin Names.

**Fourth Floor:** Putting an Exhibit Together, Capturing Specimens in Art—Scientific Illustration, Graphics Demonstration.

Free parking is available in the north Museum and Soldier Field lots. A shuttle bus will circle these areas continuously, providing free transportation to and from the Museum. Or use the free round-trip charter bus service between the Loop and the south entrance of the Museum. These *CTA* buses marked *FIELD MUSEUM* will originate at the Canal Street entrance of Union Station and stop at the Canal Street entrance of Northwestern Station, Washington and State, Washington and Michigan, Adams and Michigan, and Balbo and Michigan. Two buses will run circuits beginning at 5:45 p.m. and continuing at 15-minute intervals until the Museum closes. (Both buses will travel to the train stations until the departure of the last train. Please check your train schedule for the exact times.)

Reasonably priced dinners and snacks will be available in the Museum food service area from 6:00 p.m. to 8:00 p.m.

To achieve a more even distribution of visitors, we suggest you follow this alphabetical schedule:

| | |
|---|---|
| A through L | Thursday, April 30 |
| M through Z | Friday, May 1 |

Admittance will be by invitation, so please retain your Members' Night invitation and present it at the door for admittance for you and your family.

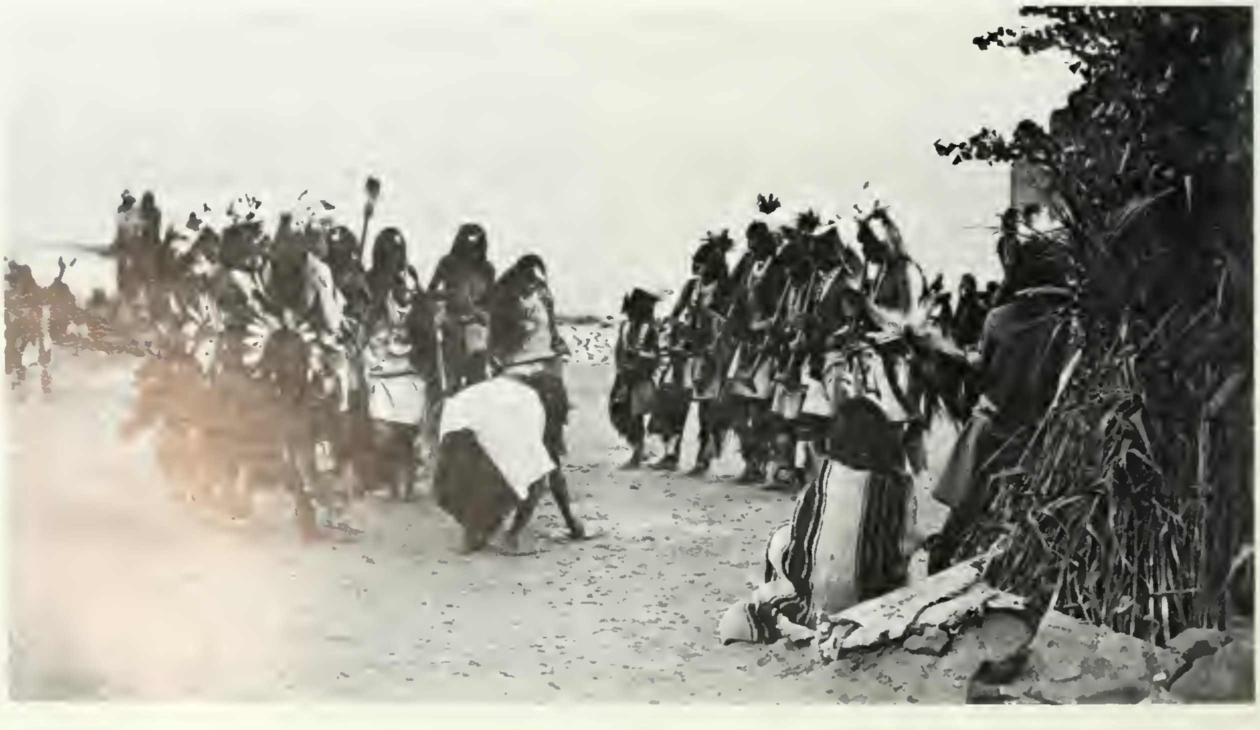
We look forward to seeing you!

*This variety of corn, bred for toughness to survive a desert habitat, represents the economic foundation upon which the pueblos were built. Careful husbandry of maize kept life going. Neglect and drought meant disaster.*

um's Hall of Southwest Indians) had 800 rooms, included 32 kivas, and must have housed well over 1,000 persons. These pueblos were like prototype multistory apartment buildings. Such structures were not equalled in size anywhere in the New World until white Americans reinvented them 800 years later.

An obvious challenge to growing crops in the desert is the scarcity of water. Indians were, of necessity, adept at getting it. Among the Hohokam of the Sonoran Desert, irrigation channels guided the lifeblood of corn to the fields. In other places, check dams and checkerboard fields retained the water from periodically intense rains. Periodic droughts and shifting rainfall patterns, nonetheless, were constant threats to Indian survival. Though these tribes developed extensive trade and redistribution networks to level out the unpredictabilities of their existence, in 1276 (the date was determined by analysis of growth rings in trees), a great drought struck many parts of the Southwest and endured remorselessly for nearly a generation.

The great drought was a terrible blow to Pueblo culture, one from which it never fully recovered.



*In this rare photograph, the flute priest of Oraibi Pueblo draws a cloud symbol on the ground, using sacred meal. The sanctity of this occasion cannot be overemphasized. Without rain and the collective power of the people, all is lost.*

New people from the north forced their way into Pueblo lands. The Pueblo world became an ever-narrowing band anchored on the upper Rio Grande River in northern New Mexico and stretching halfway across northern Arizona. Ties with Mesoamerica were finally severed. Some large cities were built, but without the great ceremonial centers of the past. Many of these cities were soon abandoned and the people moved on, searching for safer and more productive places to live. 250 years later Coronado, spurred on by lust for gold, arrived in search of the fabled Seven Cities of Cibola. He encountered Navajo, Apache, Pima, and Papago, but found only 70 Pueblos in a limited region where there had once been hundreds scattered over an area as big as France.

One of these Pueblo cultures, the Hopi, is featured in two exhibits coming to Field Museum on June 13—"Hopi Kachina: Spirit of Life" and "The Year of the Hopi." The Hopi were "conquered" by the Spanish in 1540. Forty years later the Hopi tired of the Spanish and systematically annihilated them. The Hopi stayed much as Coronado had found them, the isolated westernmost representatives of Pueblo culture. It would be easy to attribute the staying power of the Hopi to material factors: a resource-poor, desert habitat for which no one was willing to compete. However, Hopi religion has some unique qualities which have helped the Hopi resist white incursions for over four centuries. The Hopi way is probably this continent's oldest surviving indigenous religion.

*Grinding the corn,* ca. *1901*

An insight into the Hopi way begins with an appreciation for their choice of name for themselves—*Hopi.* Although often translated "The Peaceful People," Hopi means "well-mannered," or "well-behaved people." The vast majority of cultures name themselves "The People" or "The Only People," neatly separating themselves from the rest of humanity and defining outsiders as nonpersons. The Hopi recognize that other ways of being human are possible, and their name for themselves

*Young Hopi woman, with western blouse,* ca. *1901*

embodies this recognition. They do not deny alternative philosophies. Their ideas of the proper life are based on tolerance and comparison, not simple isolation and being out of touch. This straightforward but sophisticated belief system has given the Hopi an adaptive flexibility in dealing with strangers. A remarkable example of this flexibility is the fact that Tewa-speaking Pueblos, fleeing the Spanish at Santa Fe in the 17th century, sought refuge among the Hopi and have lived among them peacefully for centuries, yet have retained their identity.

Ceremonial aspects of Hopi religion, too, have always helped the Hopi deal with change. Kachinas, known to most tourists simply as dolls, are intermediaries between the Hopi and their gods. There are well over 250 kinds of kachina, distinguished from each other by the way in which they [illegible] and decorated. Kachina figures [illegible] cultural library. Performers costume [illegible] themselves up after the kachinas and become transformed into messengers to the gods. If rain is being summoned, a particular kachina will be used in a ceremony which has been effective in bringing rain in the past. Kachinas which do not work may not be used again for generations. Choices between kachinas and ceremonies are timely and immediate, rooted in the present.

The Hopi concept of time has added strength and longevity to their religion and is well described in the following: "Unlike the linear time concept of Western man, Hopi time is cyclical and rhythmic. By way of example, the ceremony held by Christians at Christmas celebrates an event that took place nearly 2,000 years ago. In contrast, when the Soyal kachina appears to signal the beginning of the new religious year, it is not a commemorative event or a celebration of the anniversary of the first such happening. Rather, it is a function that is vital to the continuation of the ceremonial cycle for the coming year. All Hopi ceremonies have this sense of immediacy to them. Even new kachina songs are composed each year."* The Hopi way is a religion that can adapt to the moment, that can

*Hopi pueblo, 1901*

move with the viscissitudes of the desert.

NATIVE AMERICAN CHALLENGERS OF THE SOUTHWEST is a six-week course about a land, once abounding in plant and animal life, profoundly ravaged over time by climate and seemingly made barren. It is about the people who settled in to coax a living from this land. A remarkable archeological record reveals the emergence of three dynamic cultural traditions, founded by native Americans practicing agriculture against heavy odds. These traditions culminate spectacularly in the great Pueblo period and live on among their inheritors in the Southwest today. Beginning in the early 1900s, Field Museum archeological expeditions were sent to the Southwest, and today the Museum houses and displays superb collections of artifacts that document 10,000 years of American prehistory.

NATIVE AMERICAN CHALLENGERS OF THE SOUTHWEST begins at Field Museum on June 18. Details on the course are featured in the Summer, 1981 *Courses for Adults* brochure. A related special event, Southwest Indian Heritage Day, is scheduled for June 27. Films, crafts, demonstrations, and performances combine to give a rich and varied view of a hard land and its people. Southwest Indian Heritage Day is featured in the *June Calendar of Events*.

*Young Hopi man, ca. 1901*

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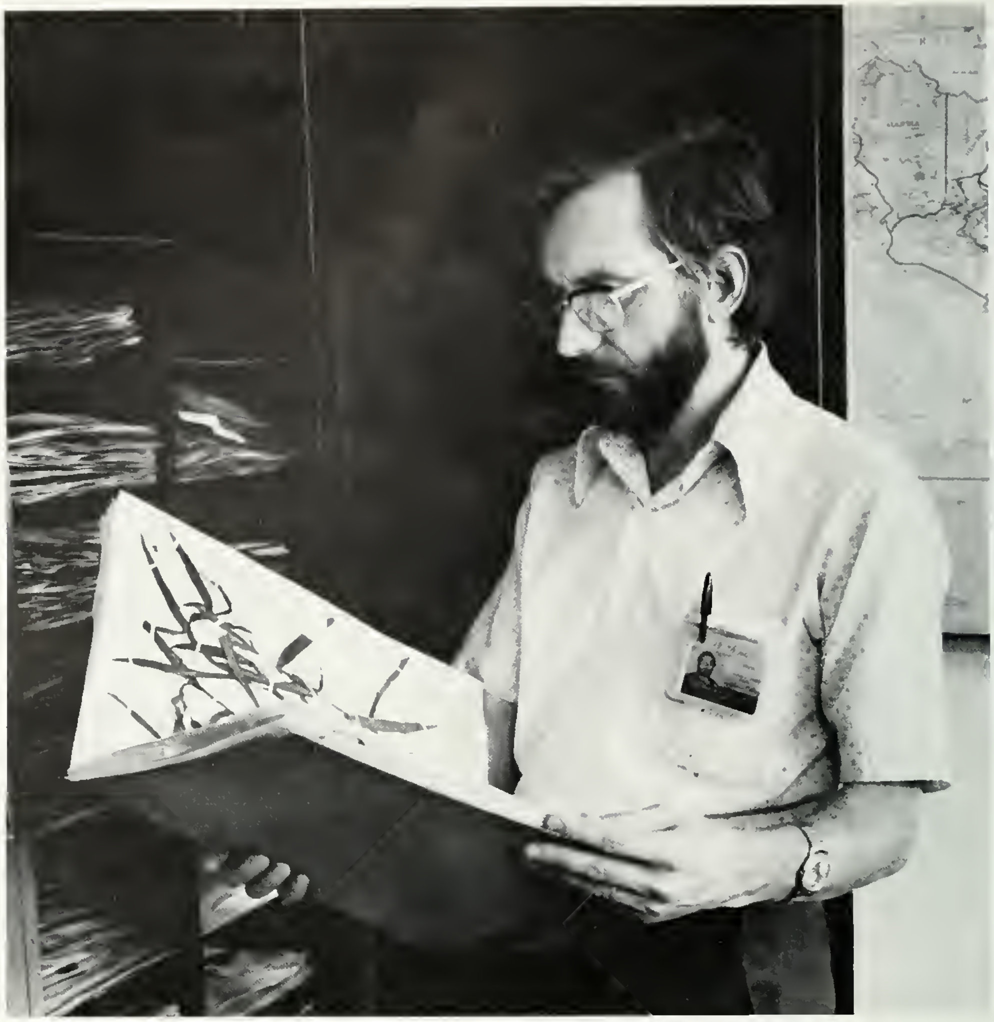
*from "Kachina," by Mark Bahti, in *Pacific Discovery*, Vol. XXXIII, No. 3, p. 3.

# THE FIELD MUSEUM
# *Spotlight on The Collections*

### Part IV

*By* MATTHEW H. NITECKI
*curator of fossil invertebrates*



D. Walsten

*William Burger, chairman of the Department of Botany, examines specimens from the herbarium, a collection of more than 2 million vascular plants, bryophytes, fungi, algae, and lichens.*

## DEPARTMENT OF BOTANY

The Department of Botany consists of the botanical research collections, the botany library, a palynology laboratory, and plant preparation and mounting areas. The research collections number over two million specimens and they are responsible for the department's research concentration in the fields of systematic and evolutionary botany of living organisms.

The Museum acquired its first botanical collections from the World's Columbian Exposition of 1893; these were largely materials of economic use. Dr. Charles F. Millspaugh, a physician by training, but an avid botanist and naturalist who in 1887 published a major work on American medicinal plants, began soliciting donations of collections for the Museum during the Exposition. Collections of gums, resins, fibers, oils, waxes, tannins, dyes, starches, cereals, sugars, spices, medicinal plants, timbers, and cabinet woods were offered by more than twenty countries. In this manner the Department of Botany began with a fine collection of cabinet woods, forest products, and useful plant products. Millspaugh became the first appointee to the scientific staff as the Curator of Botany.

The herbarium was established in 1894, and numbered 50,000 specimens by 1898. Millspaugh made important collections in the Yucatan Peninsula in the period 1894-96, and in the West Indies during 1899-1907. From this time on the Museum concentrated its efforts on the American tropics and established one of the world's major collections of Central and South American plants by sponsoring or cosponsoring more than 60 botanical expeditions to the American tropics. Jesse H. Greenman collected extensively in Mexico and Central America from 1904 to 1912. J. Francis Macbride, who joined the staff in 1922, worked in Peru and initiated one of the department's major floristic works, *The Flora of Peru*, 7,226 pages of which have been published to date.

Paul C. Standley joined the staff in 1927, and did extensive field work in Central America. Among his many publications are *The Flora of the Lancetilla Valley* (Honduras), *The Flora of Costa Rica*, *The Rubiaceae of Colombia*, also *of Ecuador*, *of Bolivia*, and *of Venezuela*. In 1964 he began the *Flora of Guatemala*, which by the time of his retirement in 1955, had been issued in four parts totaling 1,868 pages. A prolific author, Standley's bibliography lists more than 250 titles. This, together with a phenomenal memory that permitted him to identify at sight a great majority of the over 20,000 plant species of Mexico and Central America, earned Standley an enduring place in the history of American botany.

The John G. Searle Herbarium, named in honor of one of the Museum's important benefactors, consists of the following major collections, estimated as of 1979: vascular plants ca. 1,821,640 specimens; bryophytes 95,615 specimens; fungi 77,788 specimens; lichens 51,695 specimens; and algae 77,552 specimens.

These collections, taken together, make ours the fifth largest herbarium in the Western Hemisphere. Their importance is reflected in a total of 356 loan requests in 1978-79 that resulted in our sending 49,894 sheets on loan during that period.

The regional strengths and important holdings are as follows: North America: a good overall collection with some important historical collections; very good Illinois and Missouri material. Central America: overall the world's finest single collection with special strengths in Guatemala, Honduras, and Costa Rica. South America: one of the world's important collections with special strengths in Columbia, Ecuador, and highland Peru.

There is a good representation of cryptogamic exsiccatae from many areas. The uniqueness of the angiosperm collections is due to the wide representation of Central American and Andean South American materials.

*The Type Photograph Collection*. In 1929, under a plan funded by the Rockefeller Foundation, J. Francis Macbride travelled to Europe to photograph herbarium specimens of nomenclatural types. The intent was to make the photographs available for consultation by American botanists unable to finance travels to European herbaria. The wide-

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*This article originally appeared in the ASC* Newsletter Vol. 8, No. 5, *and is reprinted here with minor adaptations, courtesy the Association of Systematics Collections.*

spread adoption of the loan process was not as fully developed as it is today, necessitating travel for consultation. The project proved to be enormous and Macbride's work continued for four and one-half years, producing about 30,000 photographs. These results were of immediate importance to American systematic botany, but they acquired added meaning following the destruction of parts of European herbaria during World War II. In some instances, the only record of a species is to be found on photographic paper. Additional photographs, of presumed types, have been accumulated since Macbride's original effort, with the result that the collection now numbers 54,935 negatives. Prints are available to scientists on a sale or exchange basis. In the past ten years some 20,000 prints have been requested for professional and student use. The largest request in recent years is from Manaus, Brazil, for *all* type photos, of which about 12,000 already have been sent.

*Laboratory Facilities.* The Department of Botany has developed a laboratory devoted to palynological study. This new facility supports present research as well as provides a base on which to develop other research techniques. A representative pollen reference collection, based primarily upon the large collections housed in the herbarium, is planned. The pollen and spore collection numbers about 2,400 slides at present, and an additional 1,000 slides and specimens in liquid of anatomical and morphological specimens.

Julian A. Steyermark joined the staff in 1937; he did extensive field work in Missouri and later wrote *The Flora of Missouri*. Further field work in Guatemala and Venezuela led to his collaboration with Standley on the *Flora of Guatemala* and later to his contribution to *The Flora of Venezuela*. Louis O. Williams joined the staff in 1960 and not only completed the monumental *Flora of Guatemala* (6,528 pages in 13 parts), but also initiated new projects in Central America and Peru while serving as departmental chairman from 1964 to mid-1973. William Burger joined the staff in 1965 and has undertaken a new Flora Costaricensis project. Lorin I. Nevling, Jr. joined the staff in 1973 and brought the Flora of Veracruz project with him from Harvard University. This project utilizes computer data banking centered at the cooperating institution, Instituto de Investigaciones sobre Recursos Bioticos, in Mexico. Two visiting assistant curators currently are engaged in floristic projects, Michael Nee on the Flora of Veracruz and Michael Dillon on the Flora of Peru.

While neotropical floristics of flowering plants has been a major focus in the history of the department, a number of staff distinguished themselves in other areas, *i.e.*, Llewelyn Williams in economic botany, Francis Drouet in algae, B. E. Dahlgren in palms, and Theodor Just in paleobotany.

The herbarium also expanded through the purchase of collections and the acquisition of the herbaria of the University of Chicago and Northwestern University. It was through the purchase of important small herbaria that our cryptogamic herbarium has maintained a strong worldwide representation. The fungi are actively curated by Patricio Ponce de Leon, a specialist in Gastermycetes. Rolf Singer, author of the modern reclassification of the Basidiomycetes, is an active research associate. The bryophphyte collections are curated by John Engel, whose research is concerned with the hepaticae of the southern end of the world.

*Louis O. Williams, former chairman of the Department of Botany, now retired, prepares index to his monumental* Flora of Guatemala; *assisting him is Mrs. Williams.*

*The Economic Botany Collections.* The collection of economic botany had its origin in the Columbian Exposition, especially enriched by gifts from the national exhibits of British Guiana, the Philippines, Japan, Brazil, Burma, and India. In 1965, the collection contained an estimated 100,000 cataloged items. They are very broad in coverage, including materials on ethnobotany, medicinal plants, fiber plants, food and forage plants, vegetable oils and waxes, spices, lumber, and fine woods; and several smaller categories such as resins and lacquers, vegetable ivory, latex products, tannins, etc. One of the larger segments of this assemblage is the very fine collection of finished woods, including a set of display boards of temperate zone hard and softwoods as well as a set of boards from the tropics.

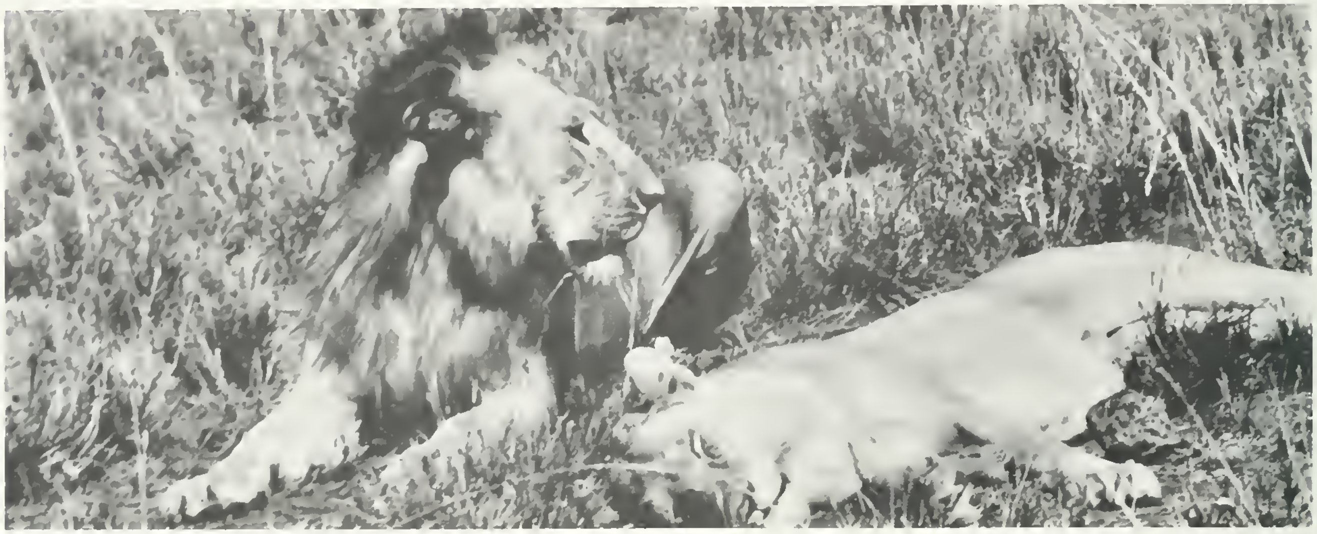
Museum expeditions added to the nucleus collection. Among these expeditions were those of Dahlgren to British Guiana, Brazil, and the West Indies and Llewellyn Williams to Amazonian Peru, Venezuela, and Thailand. Additional materials were obtained by exchange, purchase, and gift from government bureaus of agriculture and forestry throughout the world.

*Staff of the Department of Botany.* The following is a brief overview of the present research staff and their main interests:

William Burger continues to work on the Flora of Costa Rica; he also is interested in species richness in angiosperms, and how monocotyledons have evolved. Michael Dillon is working on the Flora of Peru project; he is interested in the huge Compositae family. John Engel is engaged in a project to produce a manual of the liverworts of Tasmania. This is a natural extension of his interest in austral groups which began with extensive work in southernmost South America. Sylvia Feuer-Forster is working on pollen morphology and evolution in the Santalales. Michael Nee is working on the Flora of Veracruz project. He also works with the genus *Solanum*, and the flora of central Wisconsin. Timothy Plowman specializes in the Erythroxylaceae family and had made ethnobotanical studies of its most famous species, the source of coca and cocaine. He hopes to review the medicinal and useful plants of the upper Amazon Basin. Patricio Ponce de Leon continues his studies of the Gasteromycetes with revisionary work in *Calvatia*, *Bovista*, and *Lycoperdon*. Robert Stolze curates the pteridophyte collection and recently completed a treatment of the ferns for the Flora of Guatemala. Currently he is working on a treatment of the fern allies of Guatemala.

# Field Museum Tours for Members

*For tour information, please write or call the Tours Office, 322-8862*



*Kenyan lion and lioness*

## *Kenya and the Seychelles*

September 12-October 3
Tour Price: $3,750

THERE IS NOW as there always has been, an aura or mystery surrounding Africa — Tropical islands and the coast, endless palm-fringed beaches, snow-capped mountains on the equator, jungle primeval, sun-baked plains. They are all a part of East Africa. The wildlife . . . the stately processions of elephant and giraffe, prides of lion, the beautiful and rare leopard, the elegant cheetah, the magnificent migration of the wildebeest and zebra. Only here in East Africa is there still such diversity.

The itinerary includes a daytime stopover in London, overnights at the Nairobi Hilton, Mt. Lodge Tree Hotel, Samburu Game Lodge, Mount Kenya Safari Club, Lake Hotel (at Lake Naivasha), Governor's Camp (Masai Mara Game Reserve), and other first class accommodations. Three days in the Seychelles Island and an overnight stay in London will conclude the trip.

Tour lecturer will be Audrey Faden, a native Kenyan, who formerly served as Officer in Charge of Education at the National Museum of Kenya, Nairobi.

## *Grand Canyon River Adventure*

July 17-26

Leader: Matthew H. Nitecki, curator of fossil invertebrates. For full information on this exciting trip please write or call the Tours office.

## *Peru and Bolivia: 1981*

October 15-November 1
Tour Price: $3,100

A DIFFERENT EXPERIENCE! A Different World! From the fabulous Incas, through Spanish Colonial times to the modern cities of today — yet maintaining its Latin charm. You'll love the green fertile valleys along the sandy desert coast of Peru; the highest railroad in the world; crossing Titicaca, the world's highest navigable lake by hydrofoil; flying over the Nazca plains. Our tour includes the fascinating cities of Lima, Cuzco, Trujillo, Puno, a train trip to fabulous Machu Picchu, and four full days in La Paz.

Dr. Alan L. Kolata, visiting assistant curator of

*Grand Canyon adventure, July 17-26*

South American archeology and ethnology, and project director, Field Museum Expeditions to Bolivia, will accompany the tour members during the entire trip. Dr. Michael E. Moseley, associate curator of Middle and South American archeology and ethnology, who for the past ten years has directed large-scale projects on the north coast of Peru, will join the group when we visit his area of research.

*Jewellike Devil's Lake, nestled in the Baraboo Range*

## *Wisconsin's Baraboo Range*

May 16-17

DR. EDWARD OLSEN, curator of mineralogy, will lead tour members through the Baraboo Range and along the shores and hinterland of beautiful Devil's Lake, 150 miles northwest of Chicago. The Baraboo Range is of special interest as a *monadnock* — what is left of an ancient mountain range and which now stands out above the younger rocks and sediments. The range consists of quartzite — more than one billion years old — which, although compressed in places into vertical folds, retains the original sedimentary structures. The mountains were further modified by glaciers, forming the lake and the picturesque glens, and changing the course of rivers.

Overnight accommodations and meals will be at a nearby motel. Hiking clothes are strongly recommended for the scheduled hikes. The trip is not suitable for children, but younger people interested in natural history are welcome. For further details please call or write the Tours office.

*Music high in the Andes*

## *Illinois Archeology*

May 31-June 5

For the third consecutive year Field Museum is offering an archeological field trip which will visit Dickson Mounds, Kampsville, and Cahokia Mounds. Limited to 30 participants, the trip includes site visits, lecture and slide presentations, workshops and discussions led by staff archeologists working at the respective sites. The field trip director is Robert Pickering, anthropologist and archeologist who led the 1979 and 1980 field trips. This popular trip is always booked up early, so make your reservations as soon as possible in order to avoid disappointment!

*Replica of Woodland-style home at Kampsville*

[illegible]

# FIELD BRIEFS

## Willard L. Boyd Elected Field Museum President

*Willard L. Boyd*

*E. Leland Webber*

Willard L. Boyd, president of the University of Iowa, has been elected president of the Field Museum of Natural History, succeeding E. Leland Webber, who has held the top administrative post since 1962. The appointment of Dr. Boyd marks the end of a year-long search for a successor to Webber, who informed the Board of Trustees in 1980 of his desire to retire from active management responsibilities in 1981. Boyd is to join the Museum staff on September 1. To welcome Dr. and Mrs. Boyd, a staff reception in their honor was held March 11 in the President's Room

A native of St. Paul, MN, Boyd received his undergraduate degree and a law degree from the University of Minnesota, and LL.M. and S.J.D. degrees from the University of Michigan. He has also received honorary degrees from a number of colleges and universities. He joined the University of Iowa faculty in 1954, was named professor in 1961, vice president of academic affairs and dean of the faculties in 1964, and president in 1969.

A resident of Iowa City, Dr. Boyd is married to the former Susan Kuehn. The Boyds are the parents of one daughter, Elizabeth, and two sons, Willard and Thomas.

Dr. Boyd is a member of the National Council on the Arts; a member of the Advisory Board of the Metropolitan Opera Association; a member of the boards of the Association of American Universities, the American Council on Education, the Harry S. Truman Library Institute for National and International Affairs, the Council on Postsecondary Accreditation, Elderhostel, and CEMREL, Inc. He is chair of the council of the Section on Legal Education and Admission to the Bar of the American Bar Association. In past years Dr. Boyd has served as chair of the Association of American Universities, and on many other boards and commissions.

In recent years Dr. Boyd has also served as president of the National Commission on Accrediting; as a member of the Advisory Committee for the Office for the Advancement of Public Negro Colleges, National Association of State Universities and Land-Grant Colleges; and on various commissions and panels for the American Council on Education including an ACE panel with which he continues to be involved: the National Identification Program for the Advancement of Women in Higher Education Administration.

The appointment of Dr. Boyd as chief executive of the Museum, culminating a year-long, nationwide search, completes the formation of a new administrative team at Field Museum. The first step in the transition was the appointment of Dr. Lorin I. Nevling, Jr., as director and chief operating officer of the Museum in May 1980. Dr. Nevling, a botanist, joined the Field Museum staff in 1974 as chairman of the Department of Botany and served as assistant director from 1978 to 1980.

Mr. Webber retires as president after more than 31 years' service to Field Museum. He will continue to be associated with the Museum, however, in a nonmanagement capacity, working on special projects.

## Grants and Gifts

For the second year of a five-year grant entitled "Curatorial Support for the John G. Searle Herbarium," the Department of Botany has received funding from the National Science Foundation (NSF) in the amount of $35,000. The program is under the direction of Curator William F. Burger, chairman of the Department of Botany.

The Santa Fe Industries Foundation, headquartered in Chicago, has made a gift of $25,000 toward expenses of presenting the temporary exhibitions "Hopi Kachina: Spirit of Life" and "The Year of the Hopi," both opening June 13 in Halls 26 and 27, respectively.

The Department of Anthropology has received from NSF a two-year grant in the amount of $168,000 for the project "Reorganizing Pacific Collection Storage," as part of the Systematic Anthropology Collections program. Codirectors of the program are Phillip Lewis, curator of primitive art and Melanesian ethnology, and Phyllis Rabineau, custodian of the anthropology collections.

## Hopi Exhibits Coming June 13

Two temporary exhibits, both featuring aspects of Hopi life — North America's oldest continuously surviving culture — will open at Field Museum June 13 (Members' preview June 12). "Hopi Kachina: Spirit of Life," organized by the California Academy of Sciences, will be seen in Hall 26. "The Year of the Hopi," a traveling exhibit sponsored by the Smithsonian Institution Traveling Exhibit Service (SITES), will be in Hall 27.

Large-scale models of Hopi religious ceremonies will be featured, as well as displays of hundreds of kachinas — doll-like representations of sacred figures. Beautiful candid photos and watercolor paintings by Joseph Mora will also be on view. The photos, dating from the first decade of this century, are rare indeed. Shortly after they were taken by Mora, cameras were banned from Hopi public ceremonies — they remain banned today.

The closing date for both exhibits is September 8. Further details will be announced in the June *Bulletin*.

# OUR ENVIRONMENT

## Condor Studies

Last fall a team of biologists from the Condor Research Center, Ventura, California, embarked on two foreign trips to study the endangered Andean condor (*Vultur gryphus*) and various African vultures. Information and experience gained during the six weeks of study will be used in planning and executing future recovery efforts on behalf of the endangered California condor (*Gymnogyps californianus*).

In mid-September 1980, the timing recommended by African vulture experts, the team visited study sites of the Vulture Study Group (VSG) in South Africa. This group has conducted a variety of research projects for a number of years and has netted and handled well over 1,000 adult and nestling vultures, far more than any other team presently studying vultures. Current studies of VSG are directed primarily towards two species, the lappet-faced vulture (*Torgos tracheliotus*), a bird nearly as large as the California condor; and the colonial, cliff-nesting, Cape vulture (*Gyps coprotheres*), which has a 7-to-8-foot wingspan, somewhat smaller than the California condor's wingspan of 9 feet.

While in southern Africa, team members handled nestlings of both the lappet-faced and Cape vultures, and adults of three species — lappet-faced, hooded (*Necrosyrtes monachus*), and white-backed (*Gyps africanus*). This experience afforded the team members the opportunity to observe for themselves handling techniques and various response characteristics of the different species of birds. They found that most adult vultures (with the exception of white-backed vultures) presented no handling difficulties. Some nestlings, however, did offer resistance; lappet-faced vultures are nearly inert up until they are almost ready to fledge, at which time they begin to offer some resistance; nestling Cape vultures struggle in an attempt to stay in their nests. These conclusions were consistent with the experiences of the VSG over several years of handling the birds.

All members of the VSG consider collection of data from nestling vultures to be an essential part of their studies, and a procedure which involves little risk to the bird. To date, no vultures have been lost during handling procedures by members of the VSG.

An expedition in a national park in Zimbabwe helped clarify for the team the workings and possible risks of the cannon-netting capture techniques. Evidence from this experience, and the VSG's cumulative experience of several years trapping, indicate that injury or death due to the net or attached parts is extremely unlikely. Although, early in their trapping program, VSG lost 14 vultures (out of 700 netted) — two were struck by missiles which carry the net over the birds, and 12 died of heat stress when large numbers of vultures were trapped at once and not removed immediately from under the net. Corrections made in positioning bait and the angle of the net have eliminated these problems. African vulture workers have found other trapping methods to be less desirable.

A study recently initiated with the VSG staff involves a calcium problem in Cape vultures which manifests itself in severe feather deformities and twisted bones. This condition reflects a recent socio-ecological phenomenon in which food types available to foraging vultures have changed. Apparently, the diet of Cape vulture chicks must include bone fragments brought in from the carcasses by the adults. In South Africa today, where most carcasses are domestic livestock and where the bone-crushing hyenas have been eradicated, bone fragments are not available, seriously affecting the chicks. This problem has clear implications for similar studies of the California condor.

In early October the team joined forces with the Stanley Temple group in the Sechura Peninsula of northwestern Peru. Prior to the team's arrival, the Temple group had successfully released 5 captive-bred Andean condors, flown in from the U.S. Fish and Wildlife Service's Patuxent Wildlife Research Center in Laurel, Maryland. These birds, all wearing tags attached to the patagium, a fold of skin between wing and body, and patagial-mounted radio transmitters, were moving freely around the eastern edge of the Illescas Mountains and were associating in apparently normal fashion with wild Andean condors.

During their month stay, the team was able to evaluate the efficacy and risks involved with the following major procedures on wild Andean condors: (1) capture techniques — rocket-net, clap-trap, and walk-in trap; (2) patagial-mounted radio transmitters; (3) laparoscopy; (4) blood, feather, fecal, and tracheal sampling; and (5) various handling methods.

The team's radio-telemetry activities went extremely well. They received signals from all 11 Andean condors (including 5 released captives) currently carrying transmitters in the wild. Reception was achieved both from their mobile ground stations and from a tracking plane.

Prior to the team's tracking flights, it had been thought that the Illescas Mountain condors represented an isolated population. Aerial monitoring, however, revealed that condors were crossing the 75-mile-wide Sechura Desert between the Illescas and the Andean foothills. It appears that condor movement across the desert and back again may be regular and frequent.

In recent weeks, Temple researchers have found two condors, wearing patagial markers, at two different nesting sites, each with an unmarked companion. These nests will be watched to see whether normal nesting behavior ensues.

The radioed birds have led the Temple researchers to previously unknown feeding sites, an undiscovered nest site, and areas where predator poisoning was taking place. Apart from radio-telemetry there is no other way to gather such information.

Data gathered through these studies are vital to California condor recovery efforts since the Andean condor is the closest surrogate species available for such testing. Once radio-telemetry can be used as part of field studies in California it will be possible to get badly needed habitat utilization information.

# THE ARGENTINE CONNECTION

*by* LARRY G. MARSHALL
*Assistant Curator of Fossil Mammals*

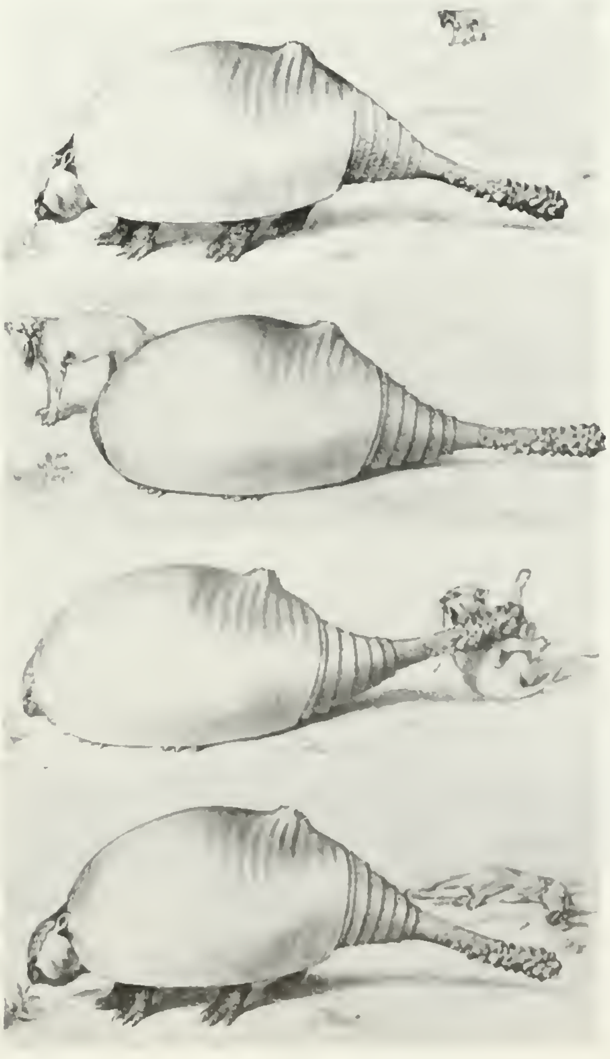
> *It is impossible to reflect on the changed state of the American continent without the deepest astonishment. Formerly it must have swarmed with great monsters: now we find mere pigmies, compared with the antecedent, allied races.*
>
> —Charles Darwin,
> *The Voyage of the Beagle*

For Charles Darwin, South America provided many of the raw materials used in the development of his theory of evolution. Of particular importance were the mammals. Why, he wondered, were there more extinct than living species? "This wonderful relationship in the same continent between the dead and the living, will, I do not doubt, hereafter throw more light on the appearance of organic beings on our earth, and their disappearance from it, than any other class of facts." Darwin's prediction has come true, and the land mammal fauna of South America has played a primary role in demonstrating that evolution indeed has occurred. Many of the relevant facts have come from knowledge of changes which occurred in this fauna during the last 6 million years.

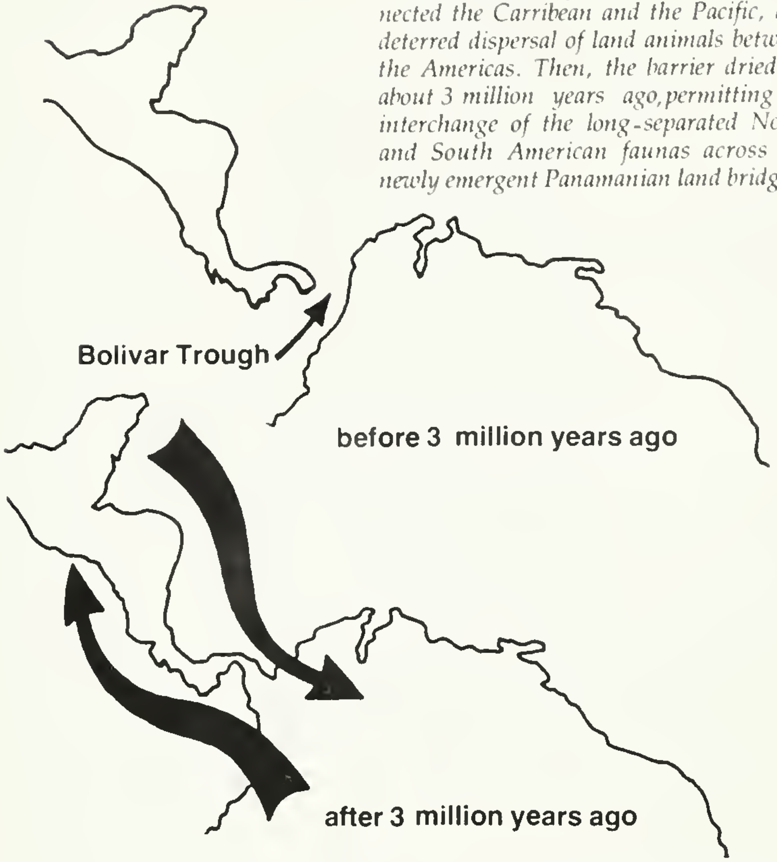
### The Isolation

Until rather recently, geologically speaking, North and South America were separated by an oceanic barrier. The Caribbean and the Pacific Ocean were connected across what is now northwestern Colombia and southern Panama and this water gap (the Bolivar Trough) deterred dispersal of land animals between the Americas. As a consequence of this barrier South America was, as Australia is today, an "island continent" during most of the last 65 million years. Evolution there occurred in a closed system and the South American fauna evolved in *splendid isolation*.[5] The eminent paleontologist George Gaylord Simpson has demonstrated that the history of the South American fauna "can be considered as an experiment without a laboratory, fortuitously provided by nature."[5] And indeed, many basic evolutionary principles and concepts were formulated from either knowledge of or direct study of this marvelous fauna.

One result of this fortuitous experiment was the development in South America of a unique fauna during isolation. Among the many strange and bizarre creatures to evolve there were the tanklike glyptodonts, distant giant relatives of armadillos. Some reached a length of 10 feet and were over 5 feet high. They were encased in a thick bony shell and could easily protect themselves from attack by simply squatting and bending the head into a tucked position. The tail, which was movable and often had a spiked



*Sabertooth meets Old Clubtail. Artist John Conrad Hansen's concept of the glyptodont* Eleutherocercus *being attacked by and disposing of the marsupial sabertooth* Thylacosmilus. *The volcano-shaped structure on the glyptodont's back is believed to have housed a large scent gland*



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clublike structure at the end, could also deal a mortal blow to an unwary predator. Some glyptodonts developed on the central part of the back what is believed to have been a large musk gland, evidenced by a small volcano-shaped area in the shell. By forcefully extruding the contents of this gland an irritated glyptodont could conceivably produce its own mini-Mt. St. Helens and engulf itself in a shower of repugnant skunklike scent which would repel even the most persistent of attackers.

Among other South American curiosities were large camellike animals called macraucheniids; large, stocky, and possibly semiaquatic beasts called toxodonts; medium-sized creatures with rodentlike teeth called mesotheres; horselike novelties called proterotheres; and the small rabbitlike hegetotheres. Despite the superficial resemblances of some of these animals to true rabbits, horses, and camels, they were in no way closely related. The appearance of animals which look alike but which are not closely related is called convergence in evolution. This evolutionary phenomenon occurs when animals evolve independently to fill particular roles, and more likely than not they come to resemble one another as well. It is simply that certain body types suit particular life styles, and through natural selection the most efficient body plan for a particular life style is favored. Similar opportunities, or "job openings," existed on each continent at the beginning of the Age of Mammals, some 65 million years ago, and those animals on hand during the "hiring process" were the ones employed. On the other hand, some animals which look quite different from one another fill nearly or exactly the same jobs (or roles) in their environment (or society). Glyptodonts ate grass, just as horses do, but otherwise there is little in common between them.

*South American ground sloths were the "ancient mariners" to make it to North America about 6 million years ago.*

Isolation and the evolution of a unique yet apparently ecologically balanced fauna in South America set the stage for the most important event of the experiment. This event began about 6 million years ago and for all practical purposes is still in progress today. Paleontologists refer to this event as *The Great American Faunal Interchange*[6] and within it are recognized two participant groups, the *ancient mariners* and the *overlanders*.

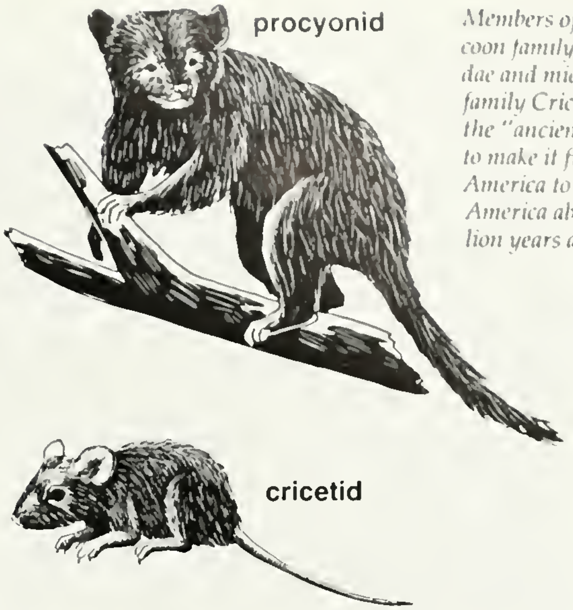
### The Ancient Mariners

By 6 million years ago the Bolivar Trough marine barrier began to decrease in width, and the American continents were, figuratively speaking, drawn closer together. As a consequence, the probabilities increased for successful chance dispersal of land mammals between the Americas. It is now known that about this time a limited but important interchange of land mammals indeed occurred. The means of dispersal of these animals across the water barrier is not certain, but a plausible mechanism has been proposed: During times of flooding and high water levels, rafts of vegetation are broken away from the banks of swollen rivers and carried to the sea. In addition to the vegetation, some rafts also include animal life, among which are occasional mammals. These animals are able to live on the provisions provided on the raft. Plant-eating animals, like rodents, will eat vegetation; insectivorous animals, like shrews, will eat insects; but carnivorous animals, like dogs or cats, will have a hard time of it since they will quickly consume whatever animal life is isolated with it on the raft. In general, large rafts will have more provisions than small rafts; the smaller the size of the animal the larger the raft and hence the greater the amount of provisions; the fewer the animals on the raft the more provisions per animal. These and other factors determine how long each type of animal can live on a raft of particular size and containing various provisions. In essence, these rafts serve as small "Noah's Arks"[3] and these are carried by ocean currents and prevailing winds to distant shores.

It is assumed that over the great expanse of geologic time a great number of such rafts existed. Although many would have disintegrated during the voyage, some would remain intact and fewer still would provide ample provisions for their passengers to survive. Upon "docking"[3] on a distant shore the surviving passengers disembarked. This, then, is the means by which some land mammals are believed to have become reluctant "ancient mariners" and crossed the Bolivar Trough marine barrier or even the Caribbean itself. If the immigrants survived and if there was a breeding pair or a pregnant female such that the species could be perpetuated, then it is possible that the species could establish itself in its new land. However, the fossil record documents only the successful voyages and colonizations, and we don't know how many failed.

The seafarers which went from South America to North America included two kinds of ground sloths, extinct relatives of the living tree sloths of the American tropics. These animals were about the size of a large dog. One kind apparently came directly from South America, while the other may have had its "port of embarcation" in Cuba, where related fossil forms occur. The Cuban population came from an earlier colonization from South America or possibly even from some other island in the Antilles.

Two distinct groups "sailed" from North America to South America at about the same time. One included a member of the carnivore family Procyonidae: raccoons and allies. The oldest fossils of this group in South America are known from several localities in west-central (Huayquerías) and northwestern Argentina (Corral Quemado, Chiquimil). The earliest form is a cat-sized animal called *Cyonasua*. One of its descendents, also extinct, was *Chapalmalania*, which reached the size of a bear and probably was also bearlike in its habits. The other group of North American seafaring immigrants were members of the rodent family Cricetidae (cotton mice and their relatives). These mice were first found in South America in beds of about 3.5 million years in age at a locality called Monte Hermoso along the Atlantic coast of Argentina just east of Bahia Blanca. These animals probably got to South America at about the same time as the procyonids, but they are of very small size and the early part of their fossil record in South America is apparently not yet known.



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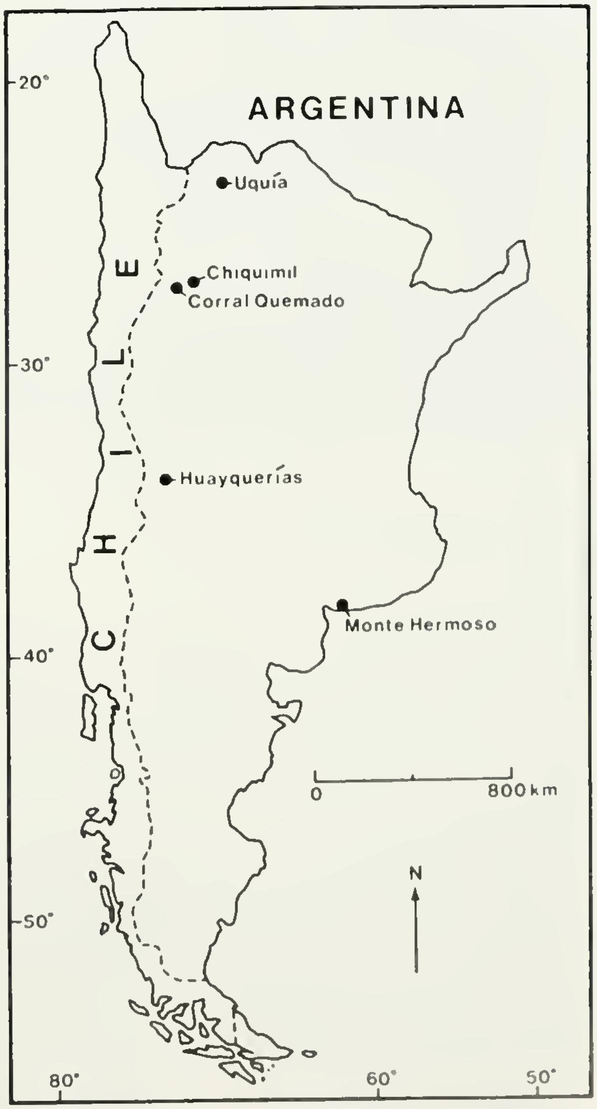

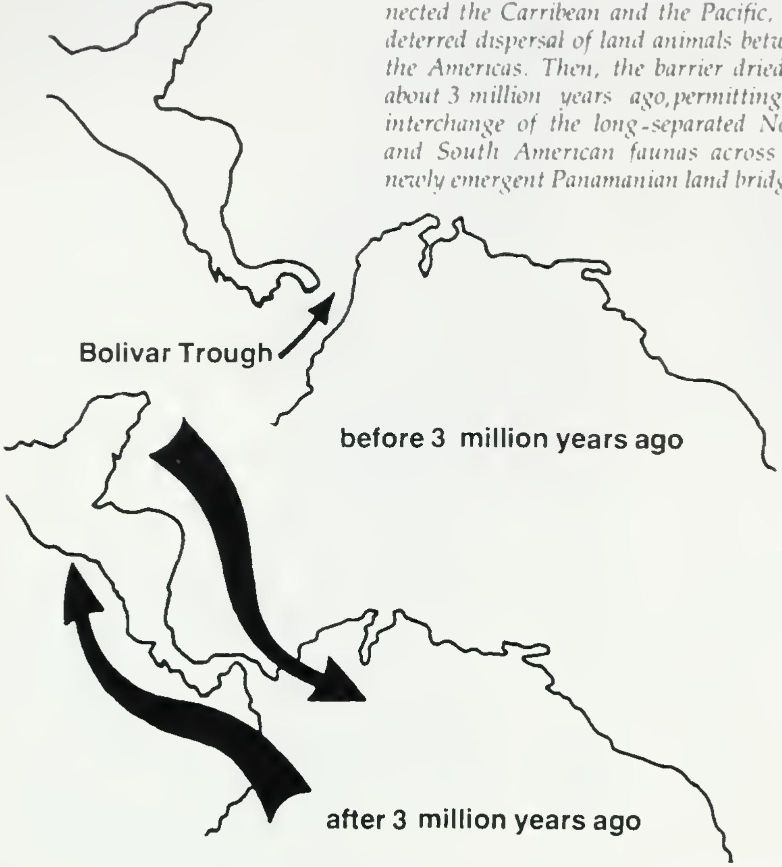

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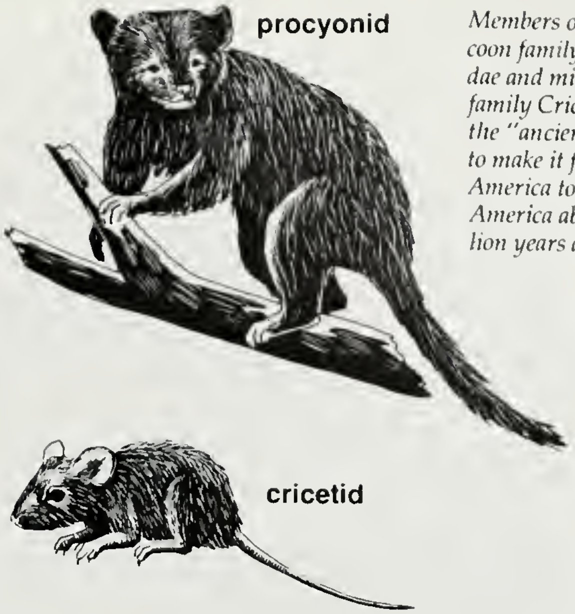

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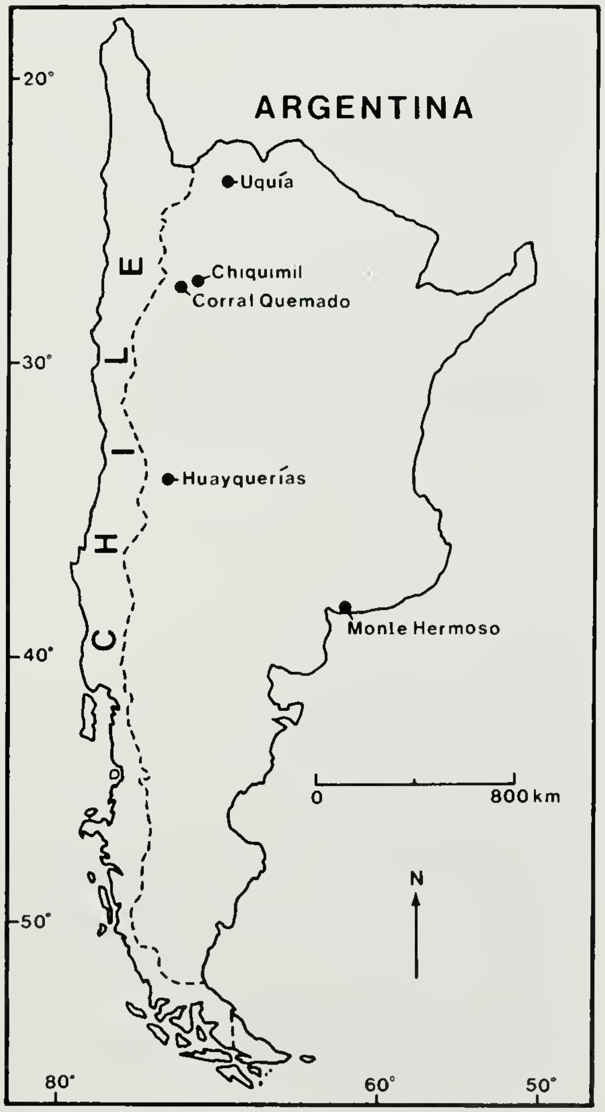
The seafarers which went from South America to North America included two kinds of ground sloths, extinct relatives of the living tree sloths of the American tropics. These animals were about the size of a large dog. One kind apparently came directly from South America, while the other may have had its "port of embarcation" in Cuba, where related fossil forms occur. The Cuban population came from an earlier colonization from South America or possibly even from some other island in the Antilles.

Two distinct groups "sailed" from North America to South America at about the same time. One included a member of the carnivore family Procyonidae: raccoons and allies. The oldest fossils of this group in South America are known from several localities in west-central (Huayquerías) and northwestern Argentina (Corral Quemado, Chiquimil). The earliest form is a cat-sized animal called *Cyonasua*. One of its descendents, also extinct, was *Chapalmalania*, which reached the size of a bear and probably was also bearlike in its habits. The other group of North American seafaring immigrants were members of the rodent family Cricetidae (cotton mice and their relatives). These mice were first found in South America in beds of about 3.5 million years in age at a locality called Monte Hermoso along the Atlantic coast of Argentina just east of Bahía Blanca. These animals probably got to South America at about the same time as the procyonids, but they are of very small size and the early part of their fossil record in South America is apparently not yet known.



Chiquimil

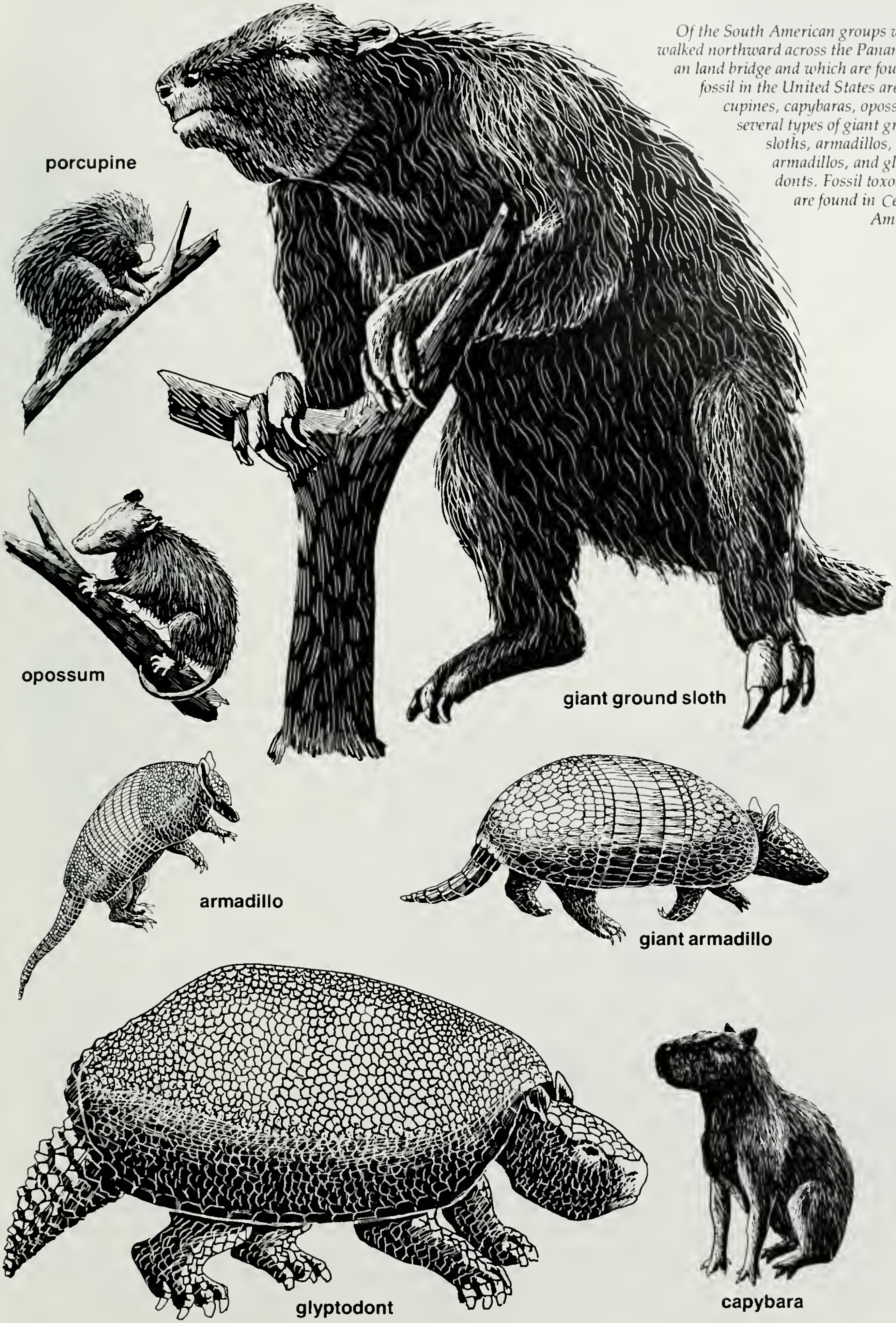
Larry G Marshall

Corral Quemado

Larry G Marshall

Huayquerias

Robert F Butler



*Of the South American groups which walked northward across the Panamanian land bridge and which are found as fossil in the United States are porcupines, capybaras, opossums, several types of giant ground sloths, armadillos, giant armadillos, and glyptodonts. Fossil toxodonts are found in Central America.*

## The Overlanders

*The predaceous flightless phororhacoid ground bird* Titanis *walked across the land bridge along with the mammals. These birds came from South America and fossils are found in Florida. This animal was described and named by the ornithologist Pierce Brodkorb (1963,* Auk, *80:111-115).*

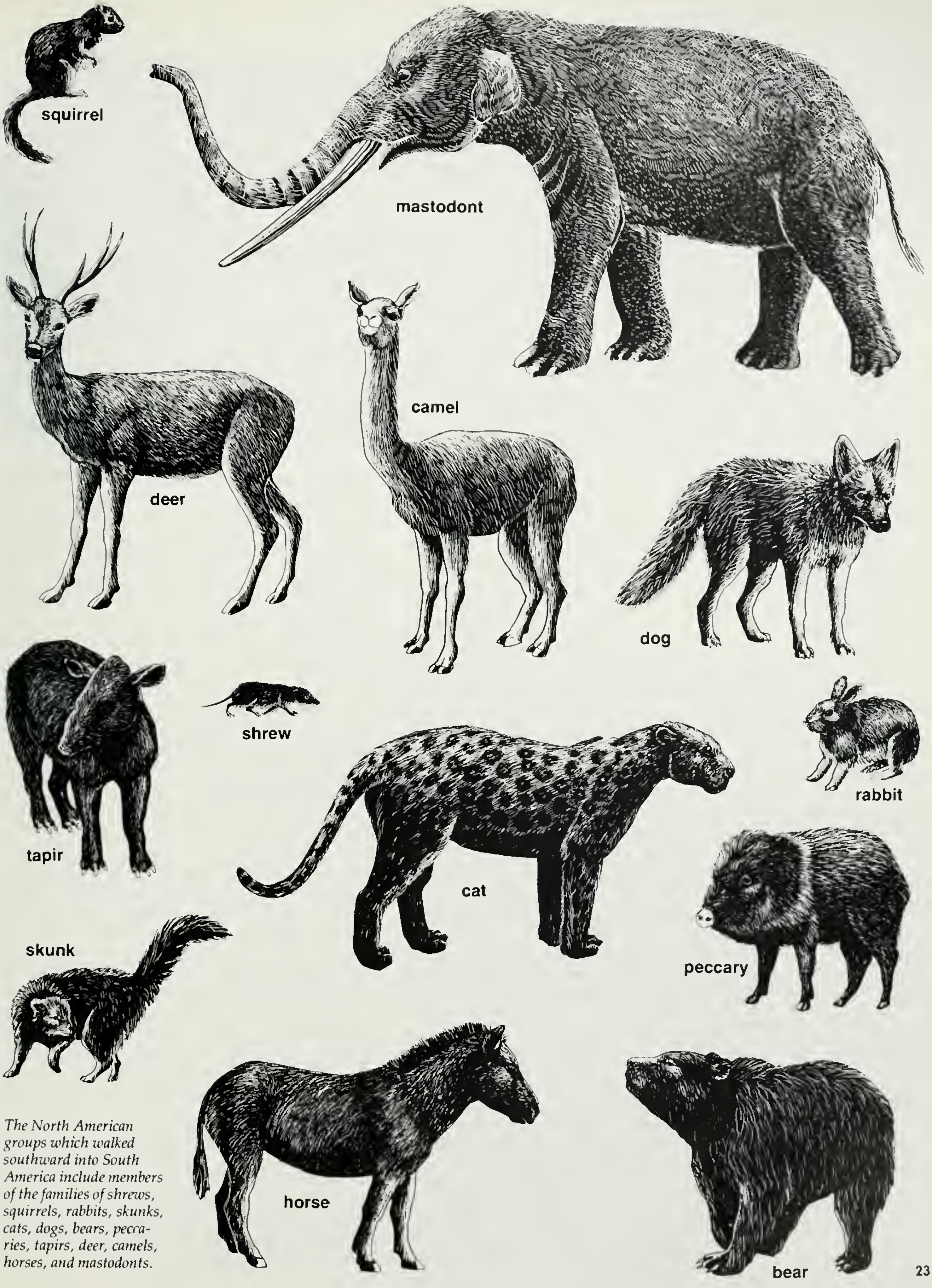
The geological processes responsible for the gradual closure of the Bolivar Trough continued. Then, about 3 million years ago, the areas of present day Panama and Colombia united; the Panamanian Land Bridge was now complete. Across this land bridge occurred the most spectacular and best documented interchange of its kind in the fossil record, [2, 4, 5, 6] and the site of the former Bolivar Trough was the "gateway" for the interchange. The long-separated land mammal faunas of North and South America were given the opportunity to mingle and interact, and their integration was to result in the formation of faunas of quite different character from those existing before the land bridge.[5] More important, each fauna was provided with the opportunity to test the other and to see which contained the most successful animals for a particular way of life. Both faunas were balanced and each had its own species adapted for a particular way of life. Moreover, it is axiomatic that no two species can do exactly the same thing and coexist indefinitely. In essence, there is only one job opening for a particular line of work in any particular place, and although there may be several applicants, only one will be permanently employed. Let's first look at the applicants, then at the hiring process.

Representatives of 17 families of mammals of South American origin eventually went northward through the "gate," following the appearance of the land bridge. As indicated by the fossil record, a large number of South American forms appeared at various localities in the United States almost simultaneously, about 2.5 million years ago. These include a capybara (*Neochoerus*), a porcupine (*Erethizon*), a glyptodont (*Glyptotherium*), a giant ground sloth (*Glossotherium*), a giant armadillo (*Kraglievichia*), and another armadillo similar to the living *Dasypus*.[6] In addition, a giant phororhacoid ground bird named *Titanis* is found in beds of similar age in Florida. This animal stood about 10 to 12 feet in height and was carnivorous. A flightless creature, it came from South America along with the mammals. [1, 6]

In beds of slightly younger age (Middle Pleistocene) appear additional South American immigrants—several more giant ground sloths, another capybara, another giant armadillo, and the opossum *Didelphis*. The toxodonts reached Central America and are found there in beds of late Pleistocene age. Most of these animals died out at the end of the Pleistocene (about 10,000 years ago). Yet the porcupine, armadillo, and opossum are still with us and are characteristic elements of the present-day fauna in the United States.

These are the only South American groups known in fossil form north of the gateway. Yet, in the recent fauna of central America are other groups of South American origin which either came north relatively recently, or did so much earlier and are simply not represented in the fossil record. Included are monkeys (Callitrichidae, Cebidae), two types of anteaters (Cyclopidae, Myrmecophagidae), tree sloths (Bradypodidae, Choleopodidae), and two families of caviomorph rodents (Dasyproctidae, Echimyidae).[2]

Animals of North American origin begin to appear in abundance in South America, more specifically at Uquia and elsewhere in Argentina, at about the same time as the early South American immigrants begin to appear in North America. In all, 14 families of North American origin are known to have immigrated to South America following the appearance of the land bridge. Among the early immigrants were members of the families of skunks (Mustelidae), peccaries (Tayassuidae), dogs (Canidae), cats (Felidae), bears (Ursidae), camels (Camelidae), deer (Cervidae), horses (Equidae), tapirs (Tapiridae), and mastodonts (Gomphotheriidae). Later immigrants included squirrels (Sciuridae), shrews (Soricidae), and rabbits (Leporidae).[2] Most of these groups are still living in South America. Only the mastodonts and horses died out at the



*The North American groups which walked southward into South America include members of the families of shrews, squirrels, rabbits, skunks, cats, dogs, bears, peccaries, tapirs, deer, camels, horses, and mastodonts.*

*Uquia. In these beds are found some of the first "overlanders" to have made it into South America.*

Larry G. Marshall

end of the Pleistocene in South America and in North America as well (the horse was reintroduced, by man, after the arrival of Columbus), while the tapirs and camels (llamas, guanacos, alpacas) survive in South America but died out in North America.[5] The faunas of today in various parts of the Americas are thus quite different from what they were several million years ago.

Present knowledge of the fossil record suggests that although the interchange began shortly after the appearance of the land bridge, it was and is a continual process. Some animals extended their ranges deep into the other continent, some barely reached beyond the gateway, while others never made it through the gateway and thus did not disperse beyond the limits of the continent of their origin. It is now evident that only animals or animal groups which had or have at least part of their distribution in tropical or subtropical areas took part in the interchange. Hence, comparisons and contrasts of dispersal potential and success must be made among these groups and need not include groups with ranges restricted to temperate areas. None of the latter groups took part in the interchange, as the tropics and subtropics were a barrier to their dispersal.[2]

### The Consequences

> *Have the subsequently introduced species consumed the food of the great antecedent races? Can we believe that the Capybara has taken the food of the Toxodon, the Guanaco of the Macrauchenia, the existing small Edentata of the numerous gigantic prototypes?*
>
> —Charles Darwin
> *The Voyage of the Beagle*

As the interchange progressed, the structure and composition of the fauna changed. This was particularly true for the mammal fauna in South America. Many of the native South American groups went extinct subsequent to the appearance of the land bridge, while the North American immigrants increased in number and diversity. These changes were relatively rapid, and today about 50 percent of the genera and 40 percent of the families of mammals living in South America belong to or evolved from groups that invaded South America during the Great American Interchange.[2]

It is tempting and indeed almost unavoidable to conjecture that the disappearance of some native South American groups was a consequence of interchange.[5] As such, attempts have been made to search for cause and effect relationships. It has been suggested that this replacement resulted from competitive interaction among members of the native and invading faunas, and that the invaders were more aggressive and therefore better competitors than the South American natives.[5] Another view is that the decline in the native fauna was due to an ongoing trend begun several million years earlier and was speeded up by ecological changes resulting in large part from the uplift of the Andes.[2] If this is the case, then the changes in the South American fauna would have occurred despite the invasion by North American immigrants.

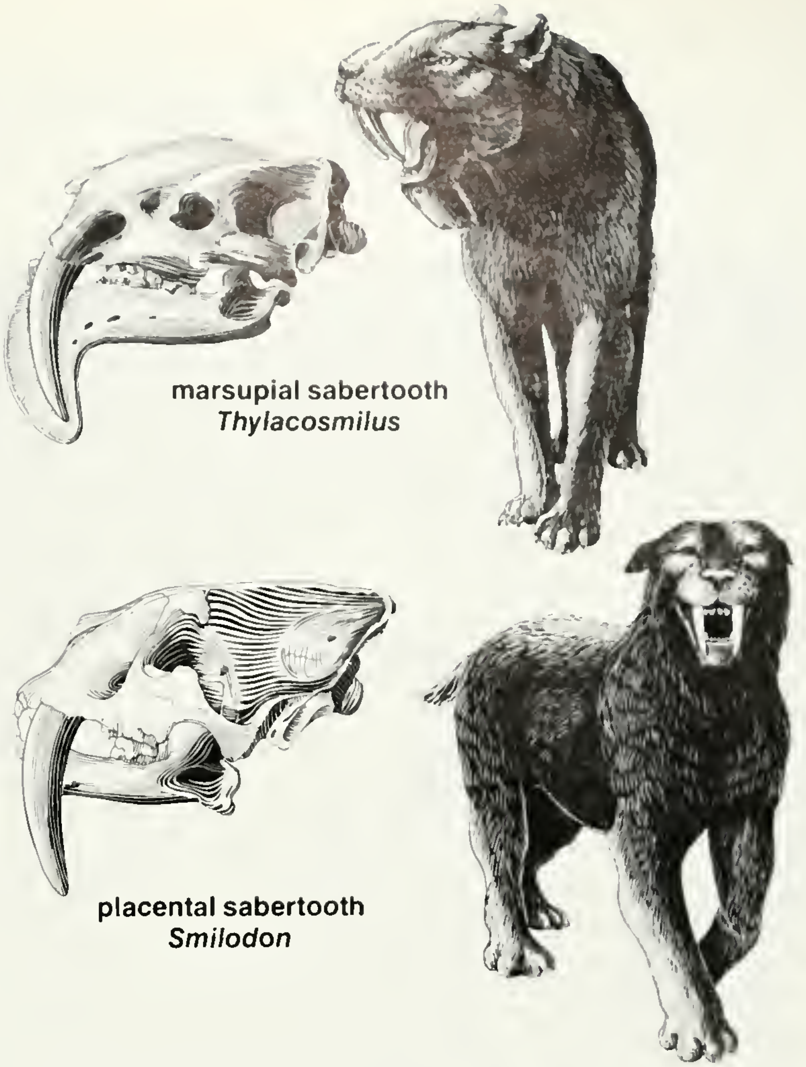
Thanks to the efforts of my colleagues G.G. Simpson,[5] S.D. Webb,[6] R. Pascual, and the late B. Patterson,[4] it is now apparent that the observed changes resulted from a mixture of these and other causes. In particular cases where invader and native animals appear virtually identical, it seems permissible to attribute the disappearance of one to the simultaneous appearance of the other. An example is the disappearance of the native marsupial sabertooth which coincides with the appearance of the invader placental sabertooth. Here a one-to-one cause and effect relationship appears probable. Yet, at the other extreme, it is believed that the invading dogs and cats were competing for the same or similar food resources as were the native phororhacoid ground birds. The decline to eventual extinction of these predaceous birds may have resulted from competitive interaction with the invading dogs and cats.

Among the herbivorous animals, the disappearance of the hegetotheres, mesotheres, toxodonts, macraucheniids, and proterotheriids may be linked to competition with invading mastodonts, deer, peccaries, camels, horses, and tapirs. However, there is nothing quite like a toxodont among the invaders, nor is there anything quite like a mastodont among the natives. In these and other cases it is difficult to identify ecological equivalents among the two faunas and as such there is little basis for inferring a specific cause and effect relationship for the disappearance of such unique groups as toxodonts. The important lesson to be learned from the interchange is that North American invaders have come to occupy many jobs previously filled by native South American groups. We may never totally understand the reasons responsible for this replacement process, but it is stimulating to try.

### The Fatal Impact

> *Did man, after his first inroad into South America, destroy . . . the unwieldy Megatherium and the other Edentata?*
>
> —Charles Darwin
> *The Voyage of the Beagle*

About 12,000 years ago man arrived onto the South American continent. Shortly before this time he invaded North America from Asia across the Bering land bridge, and continued his journey southward over the Panamanian land bridge, eventually reaching Tierra del Fuego, at South America's uttermost tip. In the Americas, man's arrival coincided with a major extinction episode. Many large herbivores and their specialized predators became extinct. In South America about 45 (37 percent) of the 120 known genera in the late Pleistocene disappeared.[2] Gone were the sabertooth cats, the mastodonts, the giant ground sloths, and the tanklike glyptodonts, just to name a few. Most investigators now agree that man's activities played a decisive role in the final demise of these animals. With the appearance of man so ended the last vestige of South America's splendid isolation; the fortuitous experiment, nonetheless, continues. □



*The extinction of the South American marsupial sabertooth* Thylacosmilus *coincides with the appearance in South America of* Smilodon, *a placental sabertooth invader from North America.*

The pen and ink restorations of mammals in this article were drawn by Field Museum staff artist Marlene Hill Werner; the phororhacoid ground bird was drawn by staff artist Zorica Dabich.

### References and Acknowledgements

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Special thanks to Academic Press Inc. for permission to reproduce the restorations in figures 3, 8, 9, and 10 from reference 2.

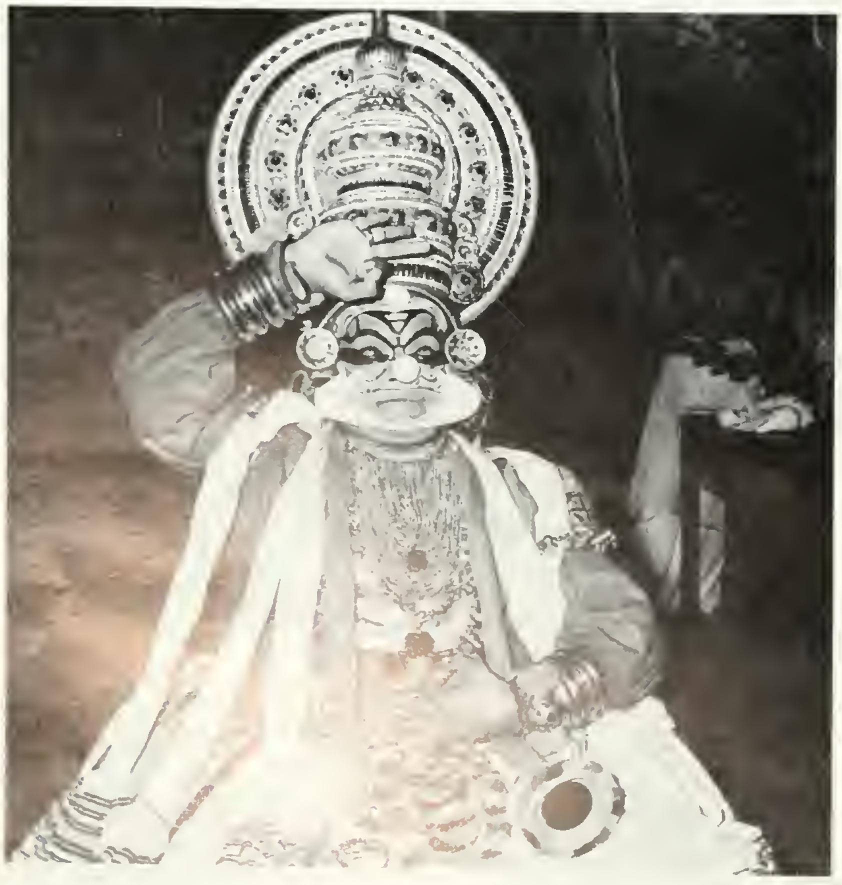
# Kathakali

## South Indian Dance-Drama

Friday, May 15
Lecture Demonstration: 10:30 a.m.
Evening Performance: 8:00 p.m.

Kathakali, which originated in Kerala, a state on India's southwest coast, is an all-male theater whose performance techniques stem in part from a vigorous martial tradition. Seventeen actors bring the magic of the god's royal heroes and demon kings of ancient Indian myth to life.

Dating from the 16th century, Kathakali is truly India's most dynamic theater form. It is related to the only surviving form of classical Sanskrit drama, Kutiyattam, whose origins may date back to the second century. The extraordinary art of Kathakali lies in the eloquent telling of stories from the great Indian epics like the Ramayana and the Mahabharata through drama, song, dance, mime, and a complex language of hand gestures. Although the heroes and villains may seem super-human in their abilities and appearance, they remain distinctly human in character. The stylization of Kathakali extends from the rich costumes, elaborate make-up, and patterns of movement to characterization as every actor endeavors to recreate a traditional, designated personality type.



Clifford R. Jones

The noble, heroic, or divine character, called *paccha*, such as Rama or Krishna, has a green face with velvet black brows and red mouth. A *katti* character, evil but with a streak of nobility, has a green base with a red and white stylized moustache snarling over each cheek. The "red beard," or demonic antihero, has a black and red face and knobs on the nose and forehead. Various other details, from false breasts to holy beads, designate a panorama of personalities—demonesses, sages, apparitions, charioteers, and evil women who are "too beautiful" and therefore suspicious. The artists are allowed to subtly develop each role and interpret them individually. In fact, certain passages of Kathakali theatre are wholly improvised every time they are performed.

The musical accompaniment in Kathakali is characterized by specific *ragas* (melodic modes) and *talas* (rhythmic patterns). The lead singer also plays a *cennalam*, or gong, with which he sets the tempo. He is joined by drums and, in dramatic moments, a conch shell, or *sankhu*.

The troupe comes from an organization which has been dedicated to the preservation and presentation of Kathakali since 1930: The Kerala Kalamandalam. Their arrival for this spring tour marks the troupe's third appearance in the United States. The tour is sponsored by The Asia Society's Performing Arts Program, which is supported by grants from The Andrew W. Mellon Foundation, Mr. John Goelet, The Weatherhead Foundation, Mr. C.Y. Tung, and the World Study Museum, Kyoto. This program is partially funded by the Illinois Arts Council.

A one-hour lecture-demonstration on the art of Kathakali at 10:30 a.m. on May 15 is a basic introduction to Kathakali epic theater and describes the major characters involved in the dance dramas, dance movements and what they mean, make-up application, and costume symbolism. The lecture-demonstration is designed to enhance one's understanding of the formal evening performance. Tickets for the lecture-demonstration are $5.00; $3.00 for Museum members.

The formal evening performance takes place at 8:00 p.m. It is held in James Simpson Theater at the Museum's barrier-free West Entrance. The program is 90 minutes long, plus a 15-minute intermission. Tickets for the evening performance are $8.00; $6.00 for Museum members. We encourage you to order tickets *in advance* for this very special event. Tickets will be sold at the door on a space available basis. For further information, call 312-322-8854.

# May and June at Field Museum

*May 16 through June 15*

*Hopi diorama (detail), Hall 7*

## New Exhibits

"HOPI." This exhibit celebrates America's oldest continuously surviving culture — the Hopi Indians, who have lived atop the barren, windswept mesas of the Painted Desert in northeastern Arizona for the past eight centuries. The exhibit features large-scale models of Hopi religious ceremonies, as well as many kachinas — doll-like representations of the sacred beings of the Hopi. Beautiful candid photographs and watercolors by Joseph Mora are also featured in the exhibit. The photographs, which date back to the first decade of this century, are rare indeed. Shortly after the photographs were taken, cameras were banned from Hopi public dances and remain banned today. Opens June 13. Halls 26 and 27. Members' preview: June 12. For further information, see below, "New Programs."

## Continuing Exhibits

ANNIVERSARY EXHIBIT. International Museum Day (see below) offers an appropriate opportunity to explore Field Museum's roots. The place to begin is the Anniversary Exhibit, which features specimens from each of the Museum's four scientific disciplines — anthropology, botany, geology, and zoology — as well as a display tracing the founding and development of this world-famous institution. Hall 3, main floor.

HALL OF AFRICAN MAMMALS. The Abyssinian colobus monkeys featured on the cover can be found in this hall, with such varied companions as the huge bongo, the ugly giant forest hog, the dainty little klipspringer, and the man-eating lions of

*Continued on back cover*

# *May and June at Field Museum*

*Continued from inside cover*

Tsavo. At the south end of the hall is the Museum's largest habitat group — 23 animals gathered around an African waterhole. Hall 22, main floor.

### New Programs

International Museum Day Celebration. Special tours, films, slide lectures, demonstrations, and informal talks focus on Field Museum's origins, collections, and behind-the-scenes activities. Programs include: "Anatomy of a Mummy" talk, "Animal Babies" craft program for children, "Exhibition Design" slide lecture, "Age of Dinosaurs" tour, and much, much more. All events free. Sunday, May 17, 11 a.m.-4 p.m.

Members' Preview to "Hopi." The Museum's new exhibit will be open exclusively for Members Friday, June 12, 1-9 p.m. After touring the exhibit, Members are invited to join Museum staff for refreshment and conversation. The exhibit will be in Halls 26 and 27.

Ray A. Kroc Environmental Field Trips. These one-day trips to local areas of ecological and biological significance continue on weekends in May and June. For information, call 322-8854.

Weekend Discovery Programs. Participate in a variety of free tours, demonstrations, and films every Saturday and Sunday between 11 a.m. and 3 p.m. Check the *Weekend Sheet* at Museum entrances for [illegible] additional programs.

☐ Saturday, [illegible] "[illegible] Planters" film feature, [illegible]

☐ Saturday, May 23: "China Through the Ages" tour, 11:30 a.m.

☐ Saturday, May 23: "Afghan Women" film feature, 1 p.m.

☐ Sunday, May 24: "Animal Babies" craft project for children, 12:30 p.m.

☐ Sunday, May 24: "Life in Ancient Egypt" tour, 2 p.m.

☐ Saturday, May 30: "Alice Elliot" and "The Hands of Maria" film features, 1 p.m.

☐ Sunday, May 31: "Ancient Egypt" tour, 2 p.m.

☐ Saturday, June 6: "Native American Foods" tour, 11:30 a.m.

☐ Saturday, June 6: Corn-grinding demonstration, 12-2 p.m.

☐ Sunday, June 7: "The World of Whales" film feature, 2 p.m.

☐ Saturday, June 13: " History of the Egyptian Collection" slide program, 1:30 p.m.

☐ Sunday, June 14: "Animal Babies" craft project for children, 1 p.m.

☐ Sunday, June 14: "The World of Whales," film feature, 2 p.m.

### Continuing Programs

Volunteer Opportunities. Individuals with scientific interests and backgrounds are needed to work in various Museum departments. Contact the Volunteer Coordinator, 922-9410, ext. 360.

May and June Hours. The Museum is open from 9 a.m.-6 p.m., Saturday-Thursday; 9 a.m.-9 p.m., Friday throughout the year.

The Museum Library. is open weekdays 9 a.m.-4 p.m. Obtain a pass at the reception desk, main floor. Closed May 25, Memorial Day.

Museum Telephone: (312) 922-9410

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# FIELD MUSEUM OF NATURAL HISTORY BULLETIN

June 1981

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# of Natural History
# Bulletin

June 1981
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## COVER

*Arizona's San Francisco Peaks, viewed from the north side. The Hopi Indians, the subject of Alice Schlegel's "The Hopi as They Were" (p. 16), have survived—and prevailed—in this seemingly inhospitable region for centuries. Photo by David Muench.*

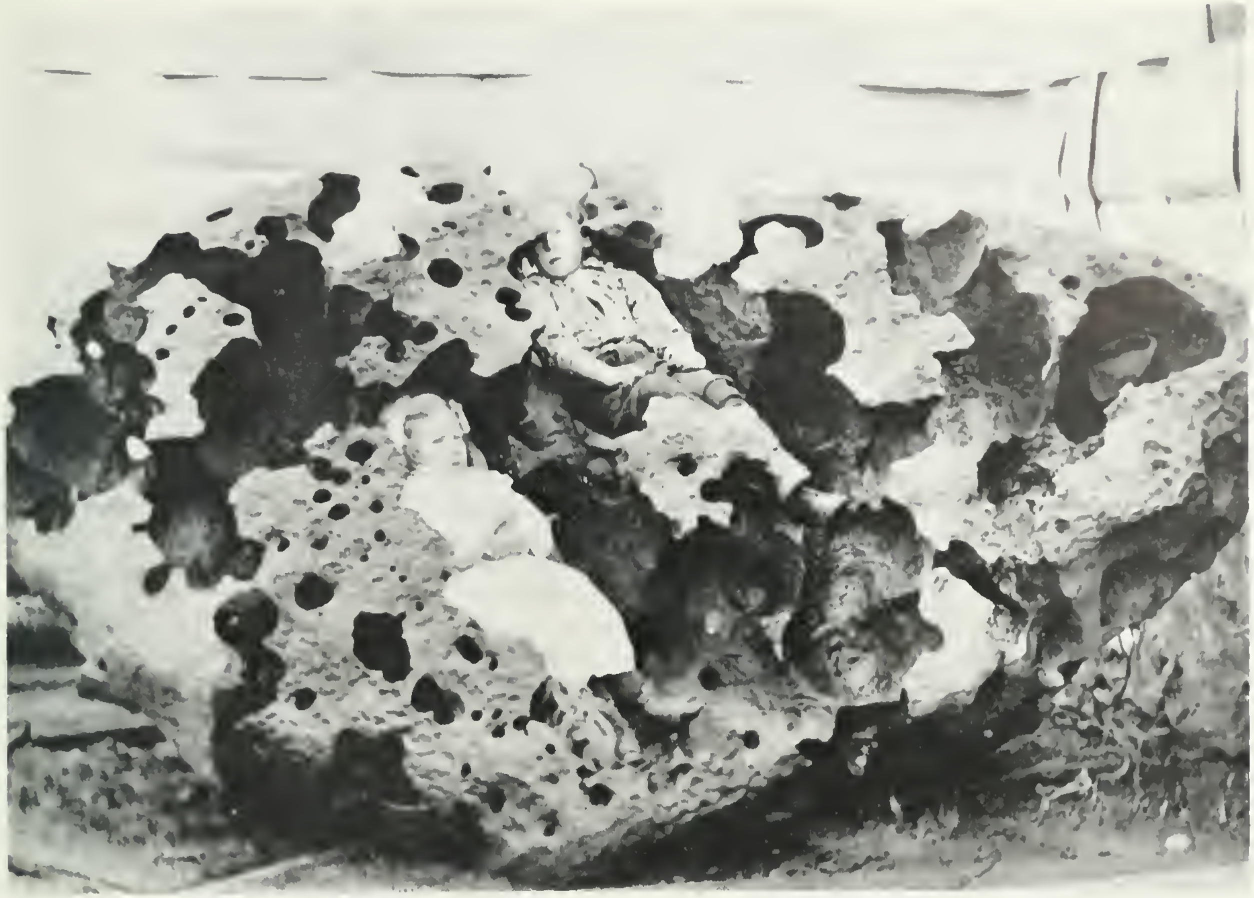
*June 13 is the opening date for two special exhibits: "Hopi Kachina: Spirit of Life," organized by the California Academy of Sciences in cooperation with the Hopi people, and "The Year of the Hopi," sponsored by the Smithsonian Institution Traveling Exhibit Service (SITES). "The Year of the Hopi," featuring turn-of-the-century watercolor paintings and photographs by Joseph Mora, will be seen in Hall 27. "Hopi Kachina: Spirit of Life," which includes materials from 18 public and private collections, will be in Hall 26.*

# HOPI

*"Hopi Kachina: Spirit of Life" and*
*"The Year of the Hopi" open June 13*

*Members' Preview*

Friday, June 12
1:00-9:00 p.m.
*refreshments*



*The 14-ton Willamette meteorite was found in Clackamas County, Oregon, in 1902. The large basins in which the children are reclined are the result of centuries of weathering and corrosion while buried in the soil. A slice of this meteorite is in the Field Museum collection*

# FARRINGTON'S FOLLY?

*By Edward Olsen*
*Curator of Mineralogy*

THE METEORITE COLLECTION at the Field Museum has turned out to be a kind of "sleeper." The story of the collection starts with Oliver Farrington back around 1894. Dr. Farrington was the first curator of geology, at what was then called the Field Columbian Museum. We don't have "curators of geology" anymore — we're all very specialized now, and are curators of this, that, or the other thing: mineralogy, fossil mammals, fossil fish, etc. But back in Farrington's day he was curator of all of that, and more.

Early on in his career he became enamoured of meteorites. It's an easy thing to do; they are the very most ancient of natural history objects — as old as the Solar System, 4,550,000,000 years! When you handle a meteorite you are touching an object older than the lunar rocks that were collected by the manned lunar landings; older than any of the rocks of the earth's surface. When Farrington was "grabbed" by these objects we'll never know, but we do know that in 1912 he managed to get the Museum to purchase a large collection of them to add to what he had already acquired by bits and pieces since 1894. He now had all together a major collection.

Farrington continued to acquire meteorites. From his collection he was able to saw or chip off pieces to exchange for samples of meteorites not already represented in the collection. He exchanged with private collectors and other museums around the world — London, Washington, D.C., New York, Berlin, Vienna, etc., a process that is still going on at Field Museum today. He also purchased meteorites when an owner preferred cash, and when he was able to raise it.

Unlike the search for most other natural history objects, it isn't, in general, a good expenditure of a curator's time to try to go out and collect them. That is a "needle-in-the-haystack" kind of operation (except for the recent collections being made in Antarctica — which is a whole other story). Farrington did, however, chase down rumors of meteorites reported to be in farm fields

*Continued on p. 26*

# Eskimo and Indian Settlements In Southwest Alaska, 1902

## *A Photographic Record*

*by* James W. VanStone
*Curator of North American Archeology and Ethnology*

In 1909 Wilfred H. Osgood (1875-1947) joined the staff of Field Museum as an assistant curator in the Department of Zoology; 32 years later, in 1941, he retired as chief curator. Prior to beginning his long and distinguished career at the Museum, Osgood was employed as an assistant in the Division of Biological Survey, a now-defunct branch of the U.S. Department of Agriculture. In this capacity, he conducted a biological survey of portions of southwestern Alaska in the summer of 1902, one of the earliest scientific explorations of that part of the territory.

Traveling chiefly by canoe, Osgood and three assistants left Iliamna Bay on July 10, crossed the mountains to Lake Clark, then portaged to the Nushagak River drainage, descending that river to the trading settlement of Nushagak on Bristol Bay, which they reached on September 12. Later that month the party crossed the bay to the village of Egegik, at the mouth of the King Salmon River, then proceeded over the Alaska Peninsula to Puale Bay, where they took passage to Seattle on a smaller steamer.

During the 1960s, I conducted archeological and ethnographic research on Lake Clark and along the Nushagak River. For someone interested in early accounts of the native inhabitants of that region, Osgood's report on his journey proved to be a disappointment.[1] He was, of course, primarily interested in the birds and mammals he encountered, but his map indicates that he visited at least three important native settlements: Old Iliamna, a Tanaina Indian community at the east end of the lake of that name; Kijik, a Tanaina village on Lake Clark; and Kokwok, an Eskimo village on the middle Nushagak River. Although abandoned today, all three were important settlements in the late nineteenth and early twentieth centuries.

I had long dismissed Osgood's report as a minimally useful historical source that was only marginally relevant to my own research when, in 1976, a member of the Museum's library staff called my attention to an unidentified album of Alaskan photographs which had been stored in the library for an unknown period of time. It was obvious from even the most cursory examination of these photographs that they represented a record of Osgood's Alaskan travels in the summer of 1902. Although the biologist's name nowhere appears on the album and some of the individual pictures are also unidentified, many

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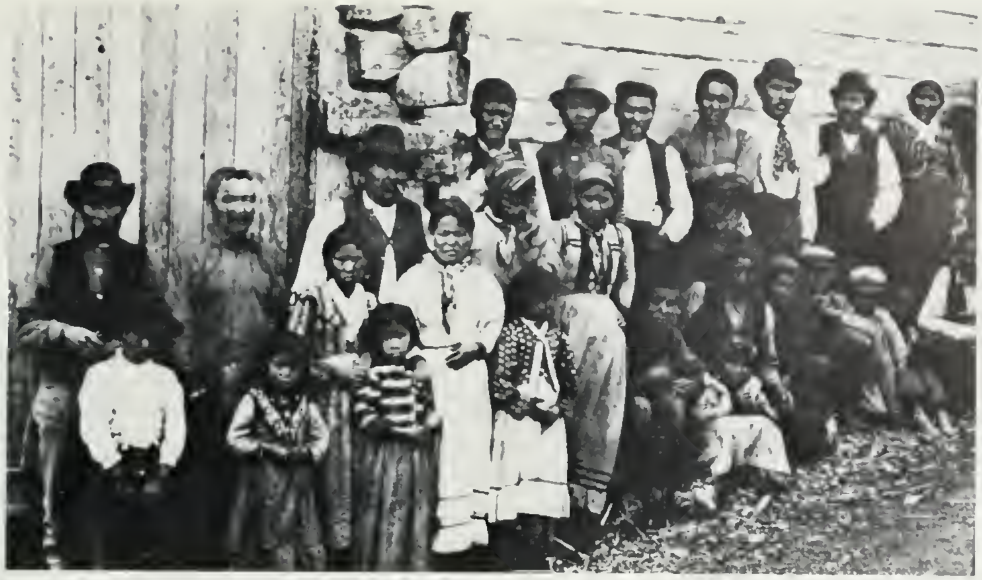

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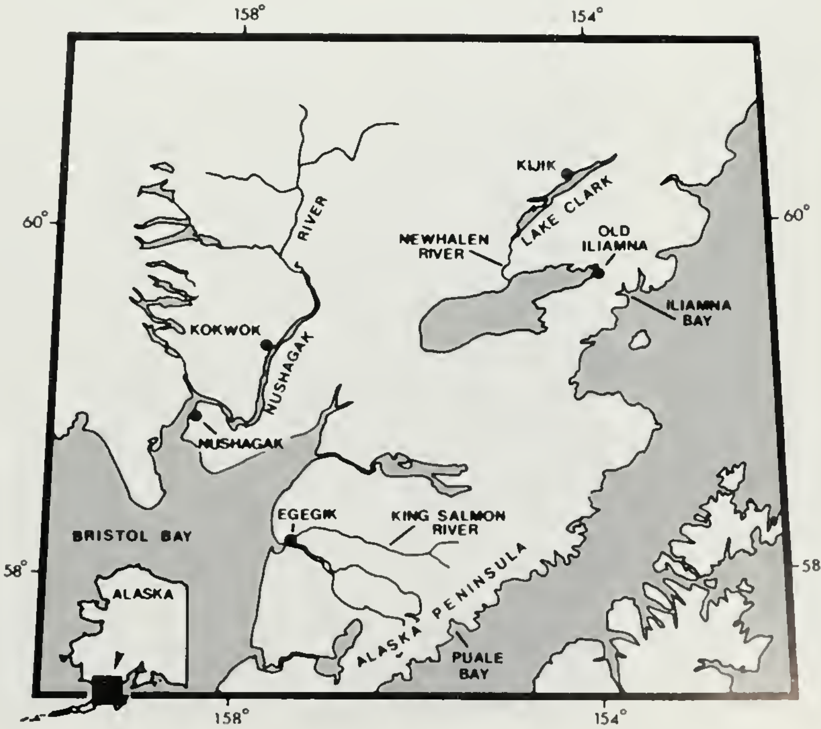
are accompanied by useful captions which clearly indicate their provenience. Nine of these photographs have been selected for illustration here because they relate to the previously mentioned Indian and Eskimo settlements, and thus are important documents relevant to the history of human occupation in the area.

Figure 1. The village of Old Iliamna, a settlement of Athapaskan-speaking Tanaina Indians on Lake Iliamna and the site of a Russian trading post early in the nineteenth century. Of all the northern Athapaskan tribes, the Tanaina are the only ones who reach the sea. Their cultural center was the Cook Inlet area, where the people were oriented toward a maritime economy with marked coastal Eskimo overtones. The settlements visited by Osgood, however, were in the interior, where the Indian economy was focused on salmon fishing and the hunting of large land animals such as caribou and moose. The interior Tanaina exploited their environment much as did the neighboring riverine Eskimos of the Nushagak River and its tributaries.

In this photograph note the log cabin residences, which had begun to replace traditional semisubterranean houses toward the end of the nineteenth century. Old Iliamna had a population of 49 at the time the first American census was taken in 1880; 10 years later 76 were enumerated. About 1910, the settlement moved across the lake to a location at the mouth of the Newhalen River, probably because an American trading post had been established there.

Figure 2. Inhabitants of Old Iliamna. Note that the villagers are clothed in typical American garments of the beginning of the present century. Among northern Athapaskans, traditional caribou skin clothing disappeared more rapidly than other items of material culture, possibly because Indians wished to identify with the white man through similar dress, but also because ready-made European garments saved work and were, in most cases, more comfortable to wear.

Figure 3. This is the only known photograph to show an appreciable segment of the village of Kijik on Lake Clark. The settlement was located at the mouth of a small river along the north shore of the lake. To the north of the settlement and almost directly behind it is Kijik Mountain, which rises to a height of more than 3,000 feet. This photograph does not show any residences. The elevated structures to the left are storage caches where dried fish and other supplies were stored. The large log structures in the center and on the far right are smokehouses where salmon were hung to dry. Smoky fires built inside these structures kept off flies and



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improved the flavor of the fish.

The village of Kijik, where archeological excavations were undertaken in 1966 by Joan Townsend of the University of Manitoba and myself,[2] was the largest and most important interior Tanaina settlement in the nineteenth century. It cannot be said with certainty when the settlement was first established, but Indian informants today believe that this took place shortly after 1800, when people moved inland from the coast. The earliest population estimates for the village are derived from the vital statistics of the Russian Orthodox mission at Nushagak, on Bristol Bay, between 1875 and 1900. Allowing for seasonal variations, it seems likely that the village supported a maximum population of 150

4

to 175 individuals throughout this period.

People began to move away from Kijik in 1902, the year of Osgood's visit, and the village was eventually abandoned, primarily because it was too far from trading posts on Iliamna Lake and from the salmon canneries that were being established along the shores of Bristol Bay; the latter offered seasonal employment to native inhabitants of the area. A measles epidemic shortly after the turn of the century depleted the population and thus may also have provided an impetus for the move.

Figure 4. Excavations at Kijik in 1966 revealed considerable variation in the size and shape of the Indians' houses. All dwellings appeared, however, to have been variations on a basic, above-ground log cabin type of construction. Details of construction were difficult to determine, because when the bulk of the population abandoned the settlement most houses were dismantled so that the logs could be used in new dwellings elsewhere.

This photograph, therefore, is of particular interest. It shows a log cabin, the roof of which slopes almost to the ground and is covered with a layer of sod. Such a house could be heated easily, either with a centrally located fireplace characteristic of traditional houses or with a cast iron stove, remains of which were abundant in the site. Although not shown here, excavations revealed that bathhouses were connected to many of the Kijik residences. Hot rocks were brought in on a wooden shovel and placed in the center of the small room, the floor of which was lower than the house floor; water was then poured on the rocks to provide steam. Attached bathhouses were also characteristic of traditional Tanaina houses.[3]

*5. Wilfred H. Osgood (left) in his later years. He is shown with Field Museum staff artist A. G. Rueckert and model of sea otter diorama.*

6

7

Figures 6 and 7 show residents of Kijik. The man in Figure 6, also present in Figure 7, is identified as the oldest inhabitant. Note the skillful construction of the structures in the background. Large spruce trees are plentiful along the shores of Lake Clark.

Neighbors of the Tanaina to the west of lakes Iliamna and Clark were the Eskimo-speaking inhabitants of the Nushagak River and its tributaries. Although Osgood may have stopped at a number of villages on his trip down the Nushagak River, only the settlement of Kokwok is shown on his map.

Figure 8. This photograph shows houses and elevated caches at Kokwok, today the largest abandoned village on the Nushagak River. These structures were located in a row along the riverbank which is flat and relatively high in this area.

Kokwok is mentioned regularly in the statistics of the Russian Orthodox mission at Nushagak between 1847 and 1910; it had a population of 145 in 1882. In 1898 the number was 106, but when Osgood's party stopped at the settlement four years later, he found only 25 people living there. However, this visit was in September, and the party noted almost as many people proceeding upriver on hunting trips.[4] Eskimo informants along the river today agree that Kokwok was in a decided decline following a severe influenza epidemic in 1918-19. Survivors moved either upriver to another village or to Nushagak Bay, where seasonal employment in the salmon canneries was an attraction.[5]

Figures 9 and 10. Modified forms of the traditional semisubterranean Eskimo house, shown in these photographs, persisted on the Nushagak River until about 1930, although missionaries encouraged the construction of log houses as early as the last decade of the nineteenth century. The transitional stage in the shift from the traditional house to the log cabin involved the construction of a sod-covered log framework, either without excavation or with a very shallow one. Entrance chambers were also unexcavated and used primarily for the storage of dog harnesses, firewood, and household equipment. Inside the house was a hard-packed, dirt floor and a central fireplace. Sleeping benches along the walls were characteristic of some structures, and there was a skylight in the middle of the roof to admit light and to allow smoke from the fire to be drawn out.

Wilfred Osgood's considerable reputation as a biologist is not, of course, dependent on his youthful contributions to Alaskan natural history. Nevertheless, his explorations in southwestern Alaska at the turn of the century represent an important early chapter in the history of scientific activity in that relatively remote region. I wish that I had been aware of the existence of Osgood's photographs at the time of my own research in the area more than 60 years later; they would have been extremely helpful. The information provided in this article will add, it is hoped, to the significance of the photographs as historical documents and, at the same time, demonstrate the manner in which a photographic record can provide an added dimension to our understanding of the recent past. □

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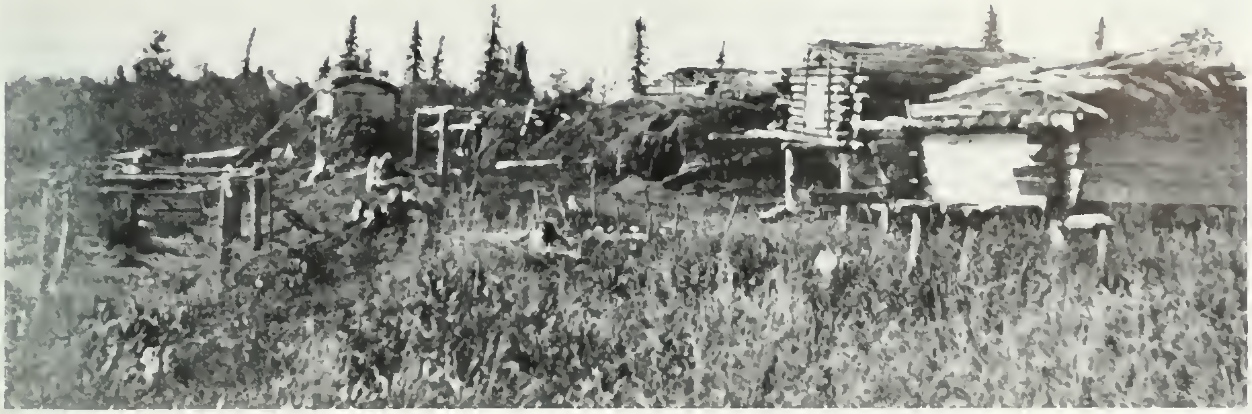

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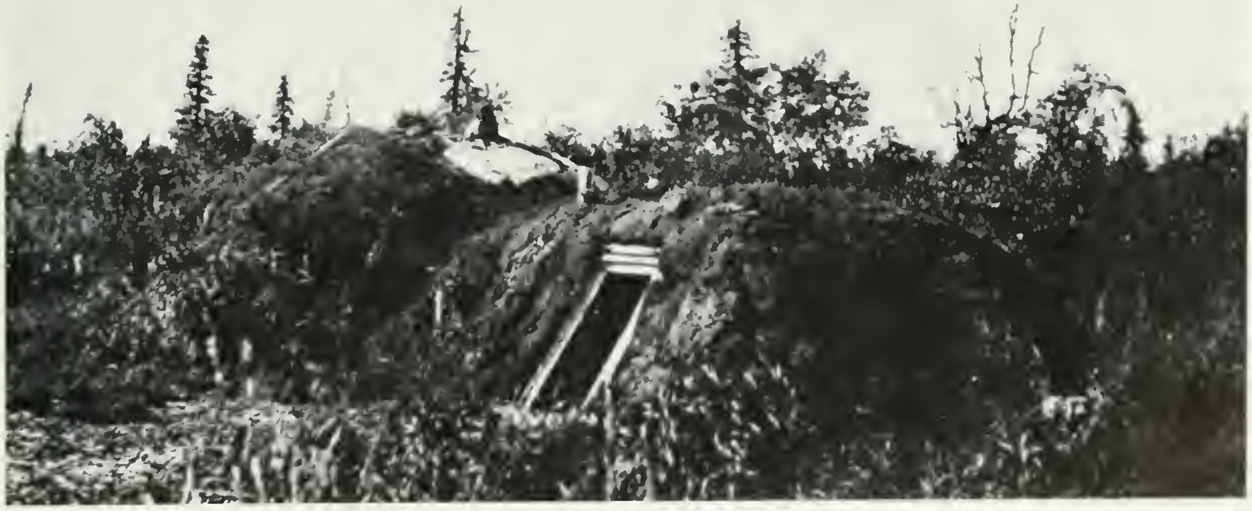

## NOTES

1. Osgood, W.H., 1904.
2. VanStone and Townsend, 1970.
3. Osgood, C., 1940, pp. 58-59.
4. Osgood, W.H., 1904, p. 18.
5. VanStone, 1971.

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10

# OUR ENVIRONMENT

## Manatee in Chesapeake Bay

On October 22, 1981, the remains of a male West Indian manatee (*Trichechus manatus*) weighing nearly 740 pounds (335 kg) and measuring over 9½ feet (295 cm) were found by Sue Black, a local resident, in Buckroe Beach, Virginia. Buckroe Beach lies on the Chesapeake Bay just north of the mouth of the James River. The apparent cause of death was starvation compounded by pneumonia.

This occurrence marks the northernmost documented range for manatees in files of the U.S. Fish and Wildlife Service. The previous authenticated record was from Ocean View, Virginia, in 1908. Ocean View is just south of the mouth of the James River in Norfolk. [*The Journal of Mammology* (February, 1950; Vol. 1; pg. 98) reported an account of what appears to be a manatee sighted in the Rappahanock River, Virginia, by Thomas Glover on June 20, 1676. The Rappahanock River lies just south of the Potomac River and north of the James River.]

Generally during the winter months the U.S. population of the West Indian manatee is restricted to peninsular Florida, congregating around natural and industrial warm-water discharge sources. (Winter distribution has apparently expanded because of warm-water discharges from industrial and power-generating plants.) Summer distribution is more widespread, occurring along the Gulf and Atlantic coasts from western Florida to Georgia. Occasionally, sightings are reported from southern Texas to North Carolina. The principle distribution of the U.S. manatee population, however, is in Florida. It occurs in the St. Johns River from Brevard County to Jacksonville; along the Atlantic coast from Merritt Island to Key West; along the Gulf coast from Key West to Tampa Bay; horizontally across the state, along the Caloosahatchee River; Lake Okeechobee and the St. Lucie Canal; and in Bernardo and Citrus Counties from Chassahowitzka National Wildlife Refuge to Crystal River (also on the Gulf coast).

The Denver Wildlife Research Center's Laboratory at Gainesville, Florida. serves as the Fish and Wildlife Service's focal point for rescue and salvage operations. The rescue and salvage effort is conducted in cooperation with and the assistance of the Florida Department of Natural Resources, the University of Miami, the Miami Seaquarium and Sea World in Orlando.

## Record Year for Whooping Crane

America's wild whooping cranes are continuing their slow but steady recovery from near-extinction with a record number of birds on their wintering grounds. The main flock of 78 birds, two more than last year, recently migrated from the Texas Gulf coast to nesting grounds in Canada. Meanwhile, a transplanted flock of about 17 whooping cranes migrated with their "foster" sandhill crane parents from the Rio Grande Valley of New Mexico to the Rockies.

Prospects for future growth in the main flock are even more encouraging, with about half of them — 19 pairs — now active breeders. U.S. and Canadian wildlife officials predict a jump in the flock's population in the next few years unless something unforeseen happens or unless most are the same sex.

Six young hatched during the spring of 1980 are among the 78 whoopers that wintered at the U.S. Fish and Wildlife Service's Aransas National Wildlife Refuge in Texas and nearby, after the 2,600-mile fall migration from Canada's Wood Buffalo National Park. Upon arrival at Aransas, families and breeding pairs staked out territories of about 400 acres, where they fed on clams, blue crabs, and occasionally acorns. Refuge officials say there is ample space at Aransas for the "hoped-for" expansion of the flock.

Before their return northward, the breeding pairs began their spectacular courtship rituals — dancing and leaping into the air, their satiny black-tipped wings spread in what one observer has called a "joyous celebration of life." Whoopers are known to form pair bonds as early as two to three years of age, but their exact breeding age is not yet known. They began mating before reaching Canada, some at Aransas and others during migration.

As the main flock approached courtship ritual time, the young "foster" flock had already departed from Bosque del Apache National Wildlife Refuge in New Mexico for its 750-mile return to the Grays Lake refuge in Idaho. At least 15 made a favorite midway stopover at two national wildlife refuges in Colorado's San Luis Valley.

Refuge officials believe the most successful technique for transplanting Patuxent-reared whoopers to Grays Lake would be to place a young female onto the territory of a male from the foster flock, keeping her safe until the two formed a strong pair bond. Researchers may get a chance to try the experiment this summer in yet another of the innovative techniques that have restored the whooping crane from a low of 15 in 1941 to this year's record number of nearly 100 birds in the wild and 24 in captivity.

## New Ruling on Sale of Alligator Meat

The U.S. Fish and Wildlife Service has revised the special rule on the American alligator (*Alligator mississippiensis*), allowing the nationwide sale of meat and other parts, except hides, from lawfully taken specimens. Under the revised rule, fabricators who manufacture products from American alligator leather are no longer required to obtain a permit. After reviewing public comments on the proposed rule, the Service decided that no substantive changes to the proposed rule were necessary.

Although fabricators are no longer required to obtain a permit, buyers and tanners engaging in trade in American alligators remain highly regulated. This is to ensure that only lawfully taken specimens enter the market. Basically, American alligator meat and other parts, except hides, may be sold nationwide if the sale is in accordance with the laws and regulations of the state in which the taking occurs and the state in which the sale occurs.

A number of conditions must be satisfied in order for harvested alligators to reach the market place: **(1)** the untanned hide may be sold or transferred only to a person holding a valid federal permit to buy hides, **(2)** the hide must be tagged by the state where the taking occurs with a noncorrodible, serially numbered tag which identifies the state, **(3)** the tag number, length of skin, type of skin, and date and place of taking must be recorded with the state, and **(4)** packages or containers for shipping American alligator must have an identifying tag or label on the outside.

Any person wishing to engage in the activities of a buyer or tanner must first apply for a federal permit from the Fish and Wildlife Service. The Service will issue a permit based on, among other things, the applicant's reliability and apparent ability and willingness to keep an accurate inventory and records of all American alligator hides, and all hides of any other species of the order Crocodilia handled by the applicant.

# TOURS FOR MEMBERS

Alan Kolata

## *Peru and Bolivia*

October 15-November 1

Tour Price: $3,100

*Dr. Alan L. Kolata and Dr. Michael Moseley—Field Museum curators who are specialists in the archeology of this region—will be lecturers for this superb tour. Lima, Cuzco, La Paz, the Plains of Nazca, Lake Titicaca, and wondrous ruins of Machu Picchu and Chan Chan are on the itinerary. Limited to 25 persons. Write the Tours Office or call (322-8862) for details.*

◄ *Village festival on shores of Lake Titicaca in Bolivia. Dancers wear costumes bearing images derived from the ancient art of Tiahuanaco, an empire that ruled the southern Andes 1,500 years ago.*

## *Grand Canyon Adventure*

July 17-26

Tour Price: $1,485

*An exciting 280-mile cruise down the Colorado River by motorized rubber raft, camping outdoors under the stars. Dr. Matthew N. Nitecki, curator of fossil invertebrates will lead the tour. Group limited to 25. For additional information call (322-8862) or write the Tours Office.*

M. E. Rade

*Grand Canyon*

Riley Jadwin

*Abu Simbel*

## *Egypt (with Nile Cruise)*

February 6-23, 1982

Price to be announced

*This is one of Field Museum's perennially popular tours—always fully booked (so make reservations now!). Emphasis on the major historical sites: the Pyramids at Giza, Memphis, Abydos, the Valley of the Kings, Karnak, Aswan, and Abu Simbel. Eleven nights aboard a deluxe Nile River cruiser. Tour lecturers are U.S. Egyptologists. Group limited to 30. Write or call the Tours Office (322-8862) for brochure*

# A Whale of a Tale

## *In the footsteps of Darwin, modern-day seafaring geologists and paleontologists explore the forbidding coast of Patagonia*

*The* Hero *waits diligently for the return of a shore party.*

*by* Larry G. Marshall
*Assistant Curator of Fossil Mammals*
*photos courtesy of the author*

Cruise 78-3 of the Research Vessel *(R/V) HERO* began at 12:30 a.m. on July 9, 1978, when we left Ushuaia harbor, southernmost Argentina, and headed east through the Beagle Channel. It was midwinter in the southern hemisphere — cloudy, bitterly cold, with several inches of snow covering the surrounding islands. The seas were choppy and became worse as we left the channel and entered the South Atlantic. Turning northward, we followed the eastern coast of Isla Tierra del Fuego and crossed the eastern opening to the Straits of Magellan, reaching a point off the coast of continental South America.

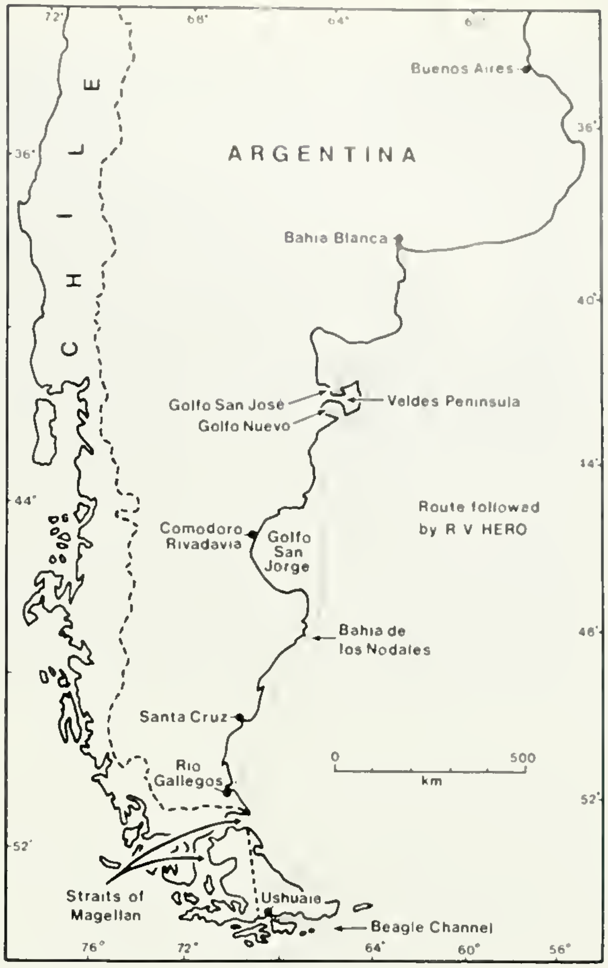
I was aboard the *R/V Hero* as part of an international team of scientists whose goal it was to collect fossils, study the geology, and determine the age of formations along the coast of southern Argentina. The work was sponsored by the Office of Polar Programs of the National Science Foundation. The last person to attempt such a study in this area was the young naturalist-geologist-paleontologist Charles Darwin, who visited the region in 1833 during his voyage on the *H.M.S Beagle.* The routes followed by the *Beagle* and the *Hero* were virtually identical.

Our group included William Zinsmeister, an invertebrate paleontologist and the group's leader, from the Institute of Polar Studies, Ohio State University; Robert Drake, a geologist from the University of California, Berkeley; William Roggenthene, a paleomagnetist from the South Dakota School of Mines; Byron Gulick of Ohio State University, field assistant to Zinsmeister; Horacio Camacho, an invertebrate paleontologist from the Centro de Investigaciones en Recursos Géologicos, Buenos Aires; and myself, a vertebrate paleontologist.

The *R/V Hero* is named after the ship used by Nathaniel Palmer, an American explorer who discovered continental Antarctica in 1820-21, and was designed and built specifically for USARP, the United States Antarctic Research Program. She is owned by the National Science Foundation and operated by Holmes and Narver, Inc., of Anaheim, California. Launched in March 1968, the *Hero* began Antarctic service in November that year. She operates from her Antarctic base at Palmer Station and serves as a mobile laboratory for scientific investigation throughout the Antarctic Peninsula area, including the southern coasts of Argentina and Chile. The *Hero* is fully equipped to support research in biological, geological, oceanographical, and related fields. With a crew of 12 and accommodations for 8 scientists, she is 125 feet long (35 feet longer than the 242-ton *Beagle*), diesel-powered, and equipped with two masts which accommodate four sails. The hull is made of New England oak, and her bow and stern are sheathed with metal for added protection against floating and pack ice.

We met the *Hero* in Ushuaia, the southernmost town in the world, located on the bottom edge of the Isla Grande de Tierra del Fuego, the largest of the multitude of islands forming the vast archipelago south of the Straits of Magellan. *Ushuaia* is a Yahgan Indian name which means "a bay penetrating to the westward," and its harbor is situated on the north side of the Beagle Channel. The name *Tierra del Fuego* means "Land of Fire" and was given by Ferdinand Magellan over 450 years ago because of the numerous fires he saw along the shore of this large island — probably warning fires of Ona Indians who were startled at the sight of Magellan's fleet.

During Magellan's first voyage to the New World in 1520, his fleet established winter quarters at 49° South on the Atlantic Coast of southern Argentina in what is now called Bahía de San Julián. For many weeks Magellan believed that the land was uninhabited, but in midwinter natives arrived at the estuary. They were Tehuelche Indians and the men among them averaged six feet in height. To the gracile Spaniards and Portuguese, these Indians seemed like giants, and in subsequent accounts their size became grossly exaggerated. The Tehuelches wore moccasins made from the skin of guanaco, a kind of South American camel, and these fur-lined slippers greatly exaggerated the size of footprints left in the sand. In his narrative of the voyage, Antonio Pigafetta referred to these Indians as *Pata-gon* ("big-feet"), in reference to those enormous foot prints. In time the land came to be known as *Patagonia*, "The Land of Giants."



IPS PATAGONIAN EXPEDITION
ARGENTINA
INSTITUTE OF POLAR STUDIES
THE OHIO STATE UNIVERSITY
1978

*Official emblem of our 1978 Patagonian expedition. The symbols (from lower left to lower right) represent key elements in the expedition—a ship (the* Hero*); fossil shell (invertebrate paleontologist, William Zinsmeister); glyptodont, a fossil mammal (vertebrate paleontologist, myself); an atom (radioisotope dating, Robert Drake); and the earth's polarity (paleomagnetism, William Roggenthene).*

The name Patagonia is generally applied to that part of Argentina lying between the Straits of Magellan to the south and the Rio Negro (or 39th Parallel) to the north and between the foothills of the Andes in the west and the Atlantic Ocean in the east. Patagonia denotes a geographic region, not a political one.

We first anchored on July 11 at Cabo Buen Tiempo (Cape Fairweather), on the Patagonian coast just north of the mouth of the Rio Gallegos. Here we saw terrestrial beds of Early Miocene age (*ca* 20 million years) and overlying marine beds of Pliocene age (*ca* 5 million years), exposed along one of the most bleak coastlines in the world. *Bleak,* the dictionary defines as "exposed to wind and weather," "blank," "desolate," "stormy," and "unfriendly"—all fitting descriptions for this inhospitable, barren coast. Patagonia is truly bleak, bleak, bleak.

*The R/V Hero is 125 feet long, diesel-powered, and equipped with two masts which can accommodate four sails. The hull is made of New England oak, and her bow and stern are sheathed with metal for added protection against floating and pack ice.*

To get to the Patagonian shore we used small pontoon boats called *zodiacs*, which are 15 feet long, 5 feet wide, and driven by a small outboard motor. A zodiac can carry a crew member to operate the motor, four scientists, and their equipment. From our point of anchor it was about two miles to shore. On our first day we started for shore in a rough sea, but when the zodiac got within 100 yards of the beach, we saw it was impossible to land. The treacherous waves crashed over the gunwhales of the little boat, and we returned to the ship drenched and freezing.

Next, we headed northward in search of calmer waters and a more favorable landing site, finally choosing a spot about a mile south of the mouth of the Río Santa Cruz. Our hopes soared when we managed to get a party ashore at 11:30 a.m. on July 12, but when they attempted to return at 1:30 that afternoon, sea conditions had worsened, and the loaded zodiac was flipped by a large wave. Our expeditionary team was stranded, soaking wet, and bitterly cold.

A rescue mission in a second zodiac was immediately launched with survival equipment (sleeping bags, food, etc.) in a floatable waterproof container. This zodiac stopped about 100 yards offshore and a line was shot to the beached party by means of a specially modified rifle. Our stranded comrades used the line to pull the waterproof container ashore, but even with survival equipment, it was a long, cold night. Luckily, weather conditions had improved by the next morning and at sunrise a zodiac was able to rescue the stranded party and tow them and their zodiac back to the ship. Despite their numbness and lack of sleep, good humor prevailed.

*To get to the Patagonian shore we used small pontoon boats, or zodiacs, which are 15 feet long, 5 feet wide, and driven by a small outboard motor. A zodiac can carry a crew member (to operate the motor), four scientists and their equipment. Leader William Zinsmeister is in the prow.*

At that point, we decided to forego further attempts to land along the southern Patagonian coast and made a beeline for Valdés Peninsula in the north. The weather had grown progressively worse, and we were travelling in high seas and 35-knot winds. Seasickness prevailed. Once you have acquired your "sea legs" a storm at sea is thrilling for even the most devout of land lovers, but it usually has the ill grace to wear out its welcome. One member of the party became seasick only two hours after leaving Ushuaia (six days earlier) and had not eaten since. Finally, on July 15, the captain decided to seek shelter in the Bahía de los Nodales just south of the Río Deseado to allow our now emaciated comrade to recuperate and to get some food down. Several of us came to realize that the great virtue of sea travel is that it makes land seem so attractive.

The lonely days at sea, coupled with hazardous weather conditions and all-too-frequent disappointments, can bring out the cynical side of even the heartiest souls. Such was the case of the author of a notice which hung in the ship's mid-lab and expressed his view of six phases of a research project: enthusiasm, disillusionment, panic, search for the guilty, punishment of the innocent, and praise and honors for the nonparticipants. And the crew had long since developed a sense of humor of their own. One sign in the wheelhouse read *"Lindsay's Law* — when your draft exceeds the water's depth, you are most assuredly aground." Another suggested an appropriate response to a pending emergency — "When in danger or in doubt, run in circles, scream, and shout."

July 16 and 17 found us heading north across the turgid waters of the Golfo de San Jorge, that large indentation in the eastern coastline of the tail of South America. On the 18th we anchored in the isolated bay of Golfo Nuevo, where to our delight we found calm, peaceful waters. There was a mad scramble as seaworn scientists claimed seats in the first zodiac headed for terra firma.

We spent three peaceful, productive days at Golfo Nuevo, studying the geology and collecting fossils. The beds in this area, all marine in origin, are late Miocene (*ca* 9 million years) in age. Fossil shells are abundant, and we made several large collections. The geologists plotted eight stratigraphic sections between Punta Ninfas and Punta Conscriptos along the south shore of Golfo Nuevo and collected rock samples for

*We spent three peaceful, productive days at Golfo Nuevo, studying the geology and collecting fossils. The beds seen here are marine in origin and about 9 million years in age*

paleomagnetic analysis and tuffs (compacted volcanic ash) for radioisotopic dating.

On July 21 we left Golfo Nuevo and headed for Golfo San José, on the north side of the Valdés Peninsula. We worked in the southwest corner of this tranquil bay, collected large numbers of fossil shells, and drew six stratigraphic sections. Then on July 25, at a spot 4 miles east of Punta Logaritmo, we made the most exciting discovery of the trip: Exposed on the upper edge of the tide flat during low tide, we found bones of the jaw and skull of a large whale. The bones were just waiting to be collected, and we were able to free them from the rock in the course of an hour. The jaw weighs about 250 pounds, and the occipital part of the skull is 3 feet wide and weighs 100 pounds. Three of us dragged these bones above the high water mark, and returned the next morning to collect them. Getting the bones 50 yards to the water's edge was no easy task, and four of us were needed to hoist them into a waiting zodiac. Fortunately, the *Hero* has a crane, which we used to lift the bones from the zodiac to the ship's deck.

The bones belong to a large baleen, or toothless, whale, a species similar to the living southern right whale, and are of great importance when we realize that there are few southern right whales in existence. If fact, one of the few southern right whale breeding areas is in the Golfo San José, and at one point in the trip, we had five of these rare animals sunning themselves alongside the *Hero*.

The presence of fossil southern right whales in the Golfo San José suggests that these animals have been living and may have been breeding in these waters for at least the last 9 million years. Although Field Museum may never possess a skeleton of the living southern right whale, we now have fossil bones of its probable ancestors.

We left Golfo San José on July 26 and headed north to the naval yard at Belgrano, near Bahía Blanca, Argentina, where the *Hero* went into drydock to get patched up for the next season's research and exploration in Antarctic waters.

In reflecting back upon this trip I recall the memorable words of Charles Darwin *(The Voyage of the Beagle):*

"In calling up images of the past, I find that the plains of Patagonia frequently cross before my eyes; yet these plains are pronounced by all wretched and useless. They can be described only by negative characters; without habitations, without water, without trees, without mountains, they support merely a few dwarfed plants. Why then, and the case is not peculiar to myself, have these arid wastes taken so firm a hold of my memory?" □

*Expedition members on the beach at Golfo San José with the whale jaw, awaiting the arrival of a zodiac. Left to right: Camacho, Drake, the author, Roggenthene.*

Hopi kachina doll

RON TESTA

# THE HOPI AS THEY WERE

by ALICE SCHLEGEL

*"Hopi Kachina: Spirit of Life" and "The Year of the Hopi" open June 13*

At a time when we feel dispirited by interest-group strife, impatient with the slow pace of the movement toward sexual equality, and threatened by random violence, it is cheering to know that there existed a society that solved its political problems through concensus, not confrontation, that granted the sexes equality, and that abhorred violence. That society was the traditional Hopi, who farmed, herded, and hunted in the dry plateau country of northern Arizona. Theirs was no utopia. Life was difficult, and only hard work and frugality ensured survival — and not always then, when the rains failed to come.

Shortages of arable land and water sometimes precipitated conflicts within villages, causing them to split apart with much bitterness. The abrasions of small village life could accumulate until they exploded in witchcraft accusations. Along with threats of starvation and enemy raids were the everyday sorrows of frequent deaths in infancy and childbirth. Probably few Hopis would choose to go back to the hard and uncertain lives of their ancestors; yet, the values and patterns of behavior of their forebears are recognized as a precious part of Hopi heritage today.

We will go backward in time and become observers of the Hopi villages as they were from about 1880 to about 1910. Pickup trucks are absent from the lanes that meander between rows of houses. Clothing, while often made of purchased cloth, is likely to be cut in traditional style, although a few younger people might try "modern" dresses and pants. Gone will be television aerials; in their stead, ladders leading from openings in house ceilings project above the rooftops. The sounds of modern living, car horns

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**Left:** *Hopi country: Through the chink we see Arizona's snow-capped San Francisco Peaks gleaming beneath a turquoise sky. The petroglyphs, little changed by centuries of sun, rain, and windstorms, were the work of some prehistoric artist. Photo by David Muench.*

*Alice Schlegel is associate professor of anthropology at the University of Arizona, Tucson.*

DAVID MUENCH

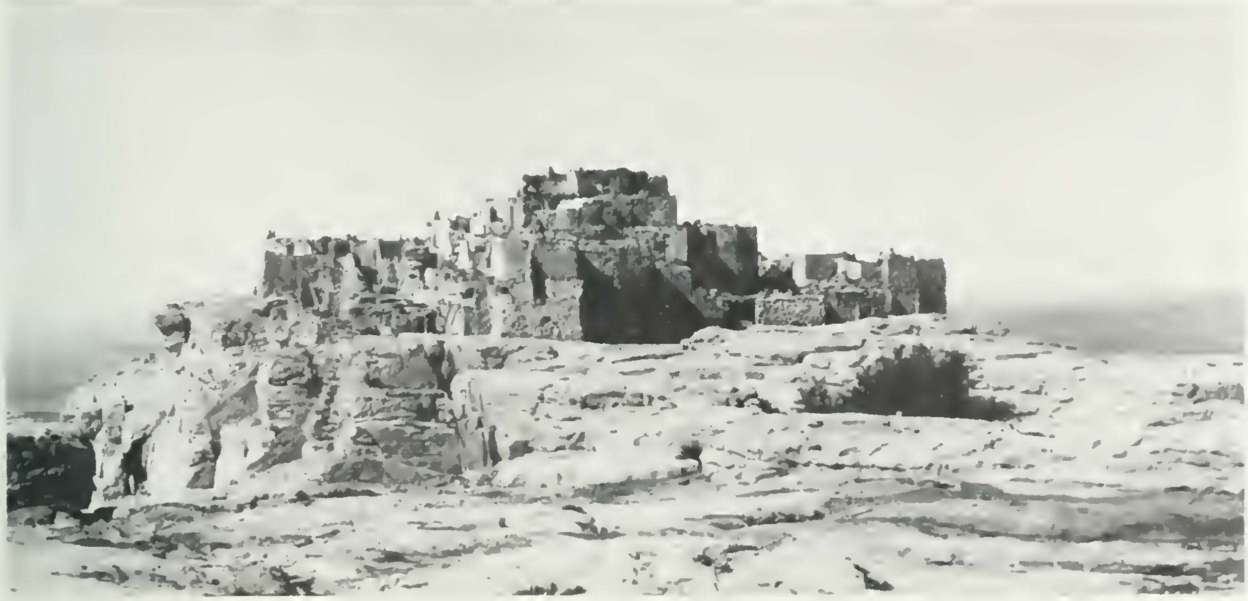
*Wild Buckwheat blooms in foothills near Arizona's San Francisco Peaks.*

and radios, are missing, but we notice the odors of earlier times — the sweetish stench of rotting garbage, the wonderful pungent smell of pinyon smoke. We move into the past.

### Hopi Village Life

Hopi villages, strung out along the mesa tops and [illegible] the dry plains, are indistinguishable at a distance from the rocks on which they are situated. Small rectangular houses, built of the rock and seeming to grow out of it, form a square around a central plaza where village ceremonies take place. From these simple dwellings, the men of the household leave each morning, well before sunrise, to herd or to cultivate their corn fields, aided only by a hoe. They plant beans, squash, and a few other vegetables, but the principal crop is the native corn, superbly adapted over centuries of experimentation to desert conditions.

The laborious grinding of this corn and the preparation of corn meal for home consumption, for use in ceremonies, for gift giving in the village, and for trade with neighboring nomadic

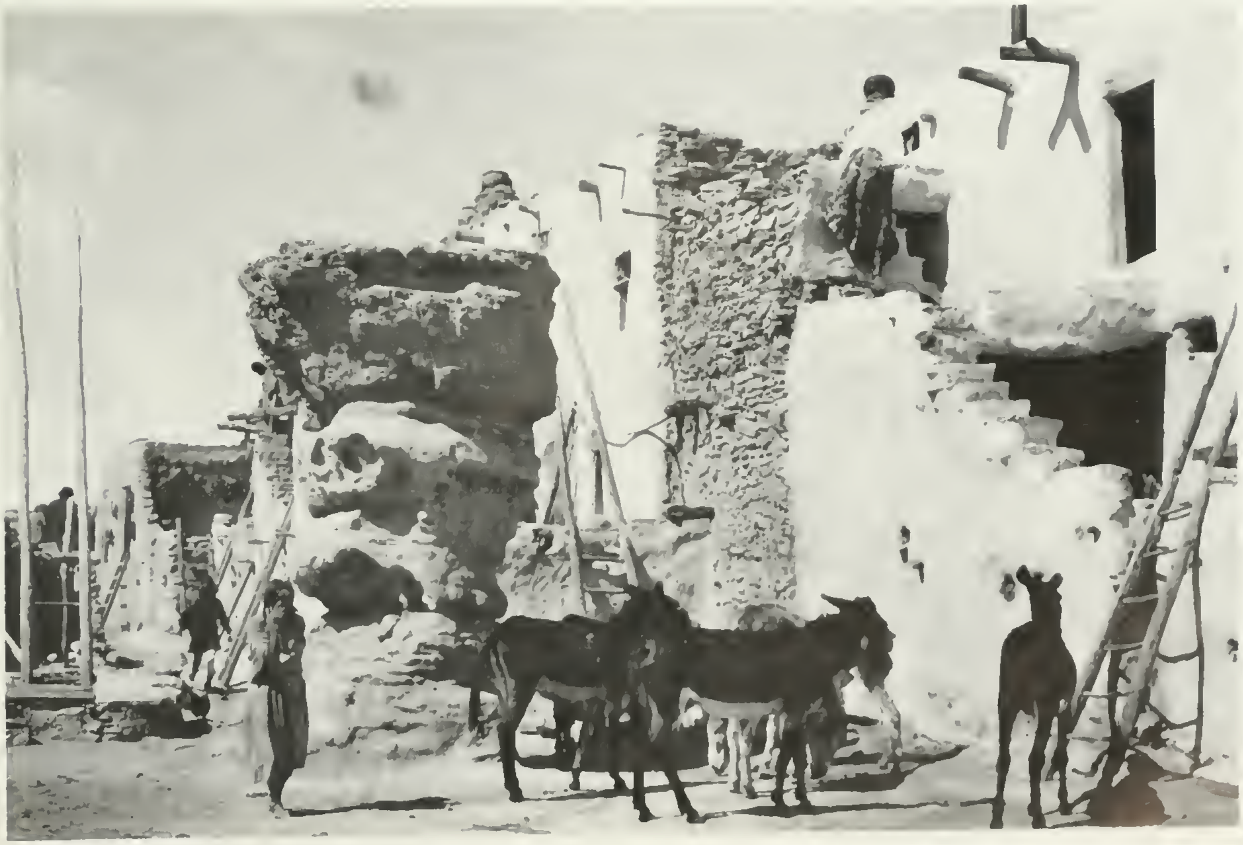


*Walpi Village, on the edge of First Mesa, appears to grow out of the rock. To farm the fields and fetch water, people had to climb down steps cut into the mesa edge to the plain below.*

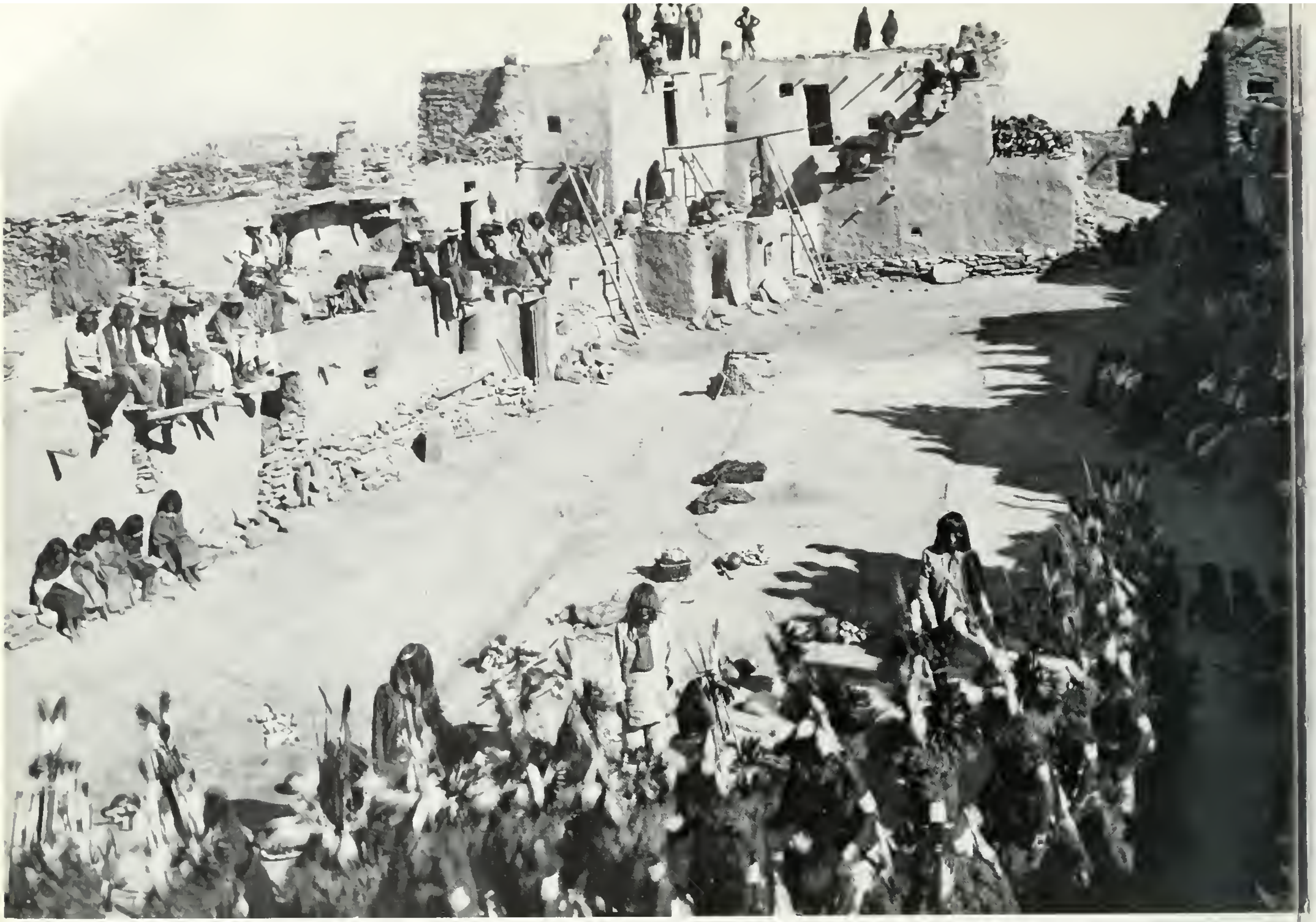
tribes is the main occupation of women. Men also grow native cotton, from which they weave the family's clothing and the handsome textiles that are traded among the tribes throughout the Southwest. Women's principal crafts are pottery and the colorful baskets they weave from native grasses.

The houses that line the plaza are virtually identical. Every family, from the village chief's to the poorest families of the least significant clan, lives more or less alike. Social rank in the community is not reflected in material possessions. But every village does have one or more structures that are different in appearance and set apart from the dwellings. These are the kivas, the ceremonial buildings in which the men's and women's religious societies hold their private ceremonies. When they are not used for religious purposes, the kivas serve as men's clubhouses, where men gather to discuss village affairs while they occupy their hands with carving, leatherwork, or other handicrafts.

It is not strange that men should spend much of their free time in the kiva rather than at home, for the houses belong to the women and, as the Hopi say, "the man is a stranger at his wife's house." This is an exaggeration, of course; husbands and wives have common interest in



*Inside Walpi Village. At this time (around 1900) doors were starting to come in use, but roof ladders were still common (as they still are in the kivas). A kiva, its roof almost at ground level, can be seen at the left of the picture with the ladder projecting above it. Donkeys, used to transport tools and produce between field and home, are rarely seen today.*



*A kachina dance in the plaza of Shipaulovi, on Second Mesa. The kachina being danced is the Niman. The piles of food in the plaza will be distributed to the spectators by the kachinas.*

the well-being of the family, and women depend on men to provide the food and clothing they require. Nevertheless, female ownership of house and its contents is well recognized by the Hopi. Women belong to the house; whereas, in another Hopi saying, "the man's rightful place is on the land," meaning he belongs outside of the house, to protect it and provide for it. It is through this role as protector and provider, rather than as household head, that men earn their honor in the home.

In contrast, women are at the very center of the house. A typical family consists of an elderly female household head and her husband, one or more married daughters and their husbands and children, and unmarried sons. When sons marry they move out into their wives' homes, and sons-in-law come in to replace them. One daughter, generally the youngest, inherits the house and cares for her elderly parents. Her sisters move out as their families expand into houses built onto or near the original house, constructed by their husbands but owned by the women.

With every house goes the right to use a portion of land owned by the clan to which the female head belongs. Men, therefore, work land controlled by their wives, and when they bring the produce into the house at harvest time, it becomes the property of the women. The ownership of the major economic goods for consumption and trade — houses, household articles and food — rests with women. Men achieve self-respect by working hard for the benefit of others, sacrificing their own desires so that their children will be provided for.

Each village is divided into a number of clans, groups of kin who trace common ancestry through the female line. Each clan, therefore, consists of men and women, who call each other "brother" and "sister," and the children of the women members. Every individual belongs to his or her mother's clan. It is these clans that own the land and that apportion it out among the women members for their husbands to farm.

While authority in the household lies with women, in the clan it is shared between women and men as "sisters" and "brothers." Each clan has two leaders, a Clan Mother and a Clan Uncle, a sister-brother pair who will pass on their offices to a daughter and son of the Clan Mother. Clan decisions, generally concerning land, are arrived at through discussion among clan members. Final authority over matters concerning the clan's role in the village rests with the Clan Uncle, while the Clan Mother has final authority over clan land. The clan acts as a strong support group for its members and often as a political faction in village politics, particularly where clan land boundaries are in dispute. Clan members consider themselves to be closely related and never marry one another. Each clan has its particular history, legends, and rituals. An important duty of the Clan Mother is to care for clan ritual objects and to pray for the health and prosperity of clan members.

Within the ceremonies that make up the elaborate Hopi ritual calendar, each clan plays its part. Most of the priestly offices are owned by clans; the village chief, who is the spiritual leader and "father" of the village, comes from the Bear Clan, the leader of the important Powamuya ceremony comes from the Badger Clan, the head priest of the Snake Society and leader of its ceremony comes from the Snake Clan, etc. The village is organized around its ceremonial calendar, which provides the rhythm of the year and brings the clans together into a cooperating body. The political leaders and the ceremonial leaders are one and the same, for it is the leaders of the most important ceremonies, plus a few other officials, who make up the village chief's council.

The dual role of the kiva, as ceremonial chamber and men's clubhouse, also points to the integration of church and state. During the periods of seclusion of ceremonial participants, and during the private portions of ceremonies, men's and women's minds must be on spiritual matters, allowing unity and brotherhood to prevail over clan and factional politics. But at other times, when the kiva serves as an informal gathering place for men, political issues are aired, and positions, formed in homes or clan meetings, are taken. Village council members, as kiva participants, listen to these discussions and are able to get a good reading of village opinions. Supported by this information, their council decisions reflect village concensus or at least the most widely held positions.

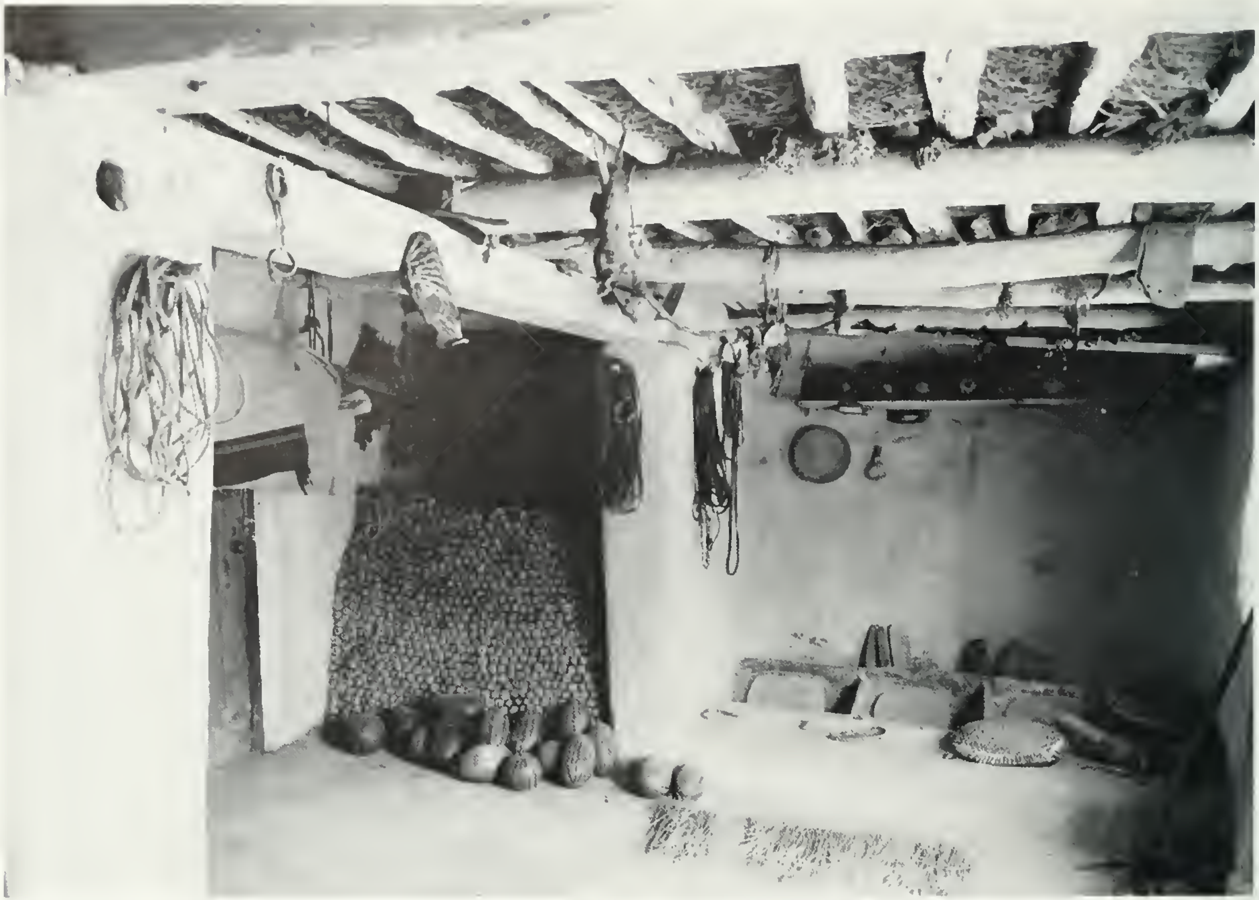
While at first glance the Hopi political system might look autocratic, with its hereditary offices and ranking of clans by ceremonial and political importance, the process of discussion at every level ensures that every possible position is heard and taken into account. All persons, even those from low-ranking clans that do not own any leadership offices, participate in discussion. Like the village chief, the leaders see themselves as fathers to the village, to protect it through prayers that bring down the blessing of the gods. Any leader who tries to impose his will on the people would find himself a social outcast, a target of gossip and, worst of Hopi punishment, ridicule.

Given the importance of women in the household and clan and the fact that women speak up freely in clan meetings, women's opinions are well represented in kiva discussions even though women are not present. A man would have to be very brave or very foolish to take a position that was opposed by the women of his household or clan if he wanted any peace in his domestic life. In addition to the economic and social power inherent in women's household and clan position, direct political power is available to certain women, the sisters of the ceremonial leaders. In many of the important ceremonies, the leader's sister or women of his clan play a necessary ritual role. There have been known cases of sisters refusing to play these roles unless the brother capitulated in a political dispute, thus effectively exercising the veto. In this society, no one can give orders.

Growing up Hopi means constant training in cooperation, responsibility, and self-reliance. Suggestions, admonitions, cautionary tales, and always the threat of mockery — these, rather than commands, instruct children in proper behavior and make them highly sensitive to the good opinions of others. Punishment is used, but it often has a ritual as well as disciplinary connotation. A child might be purified from his bad behavior by being held in juniper smoke — and, incidentally, find the experience so unpleasant that he would in the future behave properly. Or a frightening costumed figure

## HOPI SHOP

In conjunction with the Hopi exhibits (June 13-September 8), a special shop, located at the entrance to Hall 27, will feature arts and crafts of the Hopi: silver jewelry, ceramics, wicker and yucca basketry, textiles, and even kachina dolls. An excellent selection of books on Hopi life and culture, as well as on Southwest Indian culture in general, will be available. The main Museum Shop, on the first floor, will also carry a selection of such items.



*This storage room tells us a good bit about Hopi material life at the turn of the century. Stored corn—white below, blue above, watermelons on the floor, and pumpkins drying on a shelf, were staple vegetable foods. Above the stacked corn hang bunches of sweet corn that have been roasted, a process that converts the carbohydrates to sugar and preserves the corn for many months. Above the door is a sheep's rib cage with dried meat attached. This will be used for making soup. Dried meat can also be seen on a shelf above the pumpkins, and fresh meat is drying on a pole above the horse tack on the center wall. Other indications that the family owns one or more horses is the rope to the left and a hobble above the door. The technology of Hopi food production is well represented here, from the hoe at the right, to the drying and storing facilities, to the corn-grinding bins at the back. Baskets for sifting different types of meal are placed near the bins, and a "modern" mesh sieve hangs on the wall in back. Next to it is a painted baby's rattle. Herbs for ritual-medicinal purposes hang from the beams, as does a cotton knitted man's legging. Other native textiles hang from a pole in the small room to the side. The grasses drying on the floor will be used for weaving baskets.*

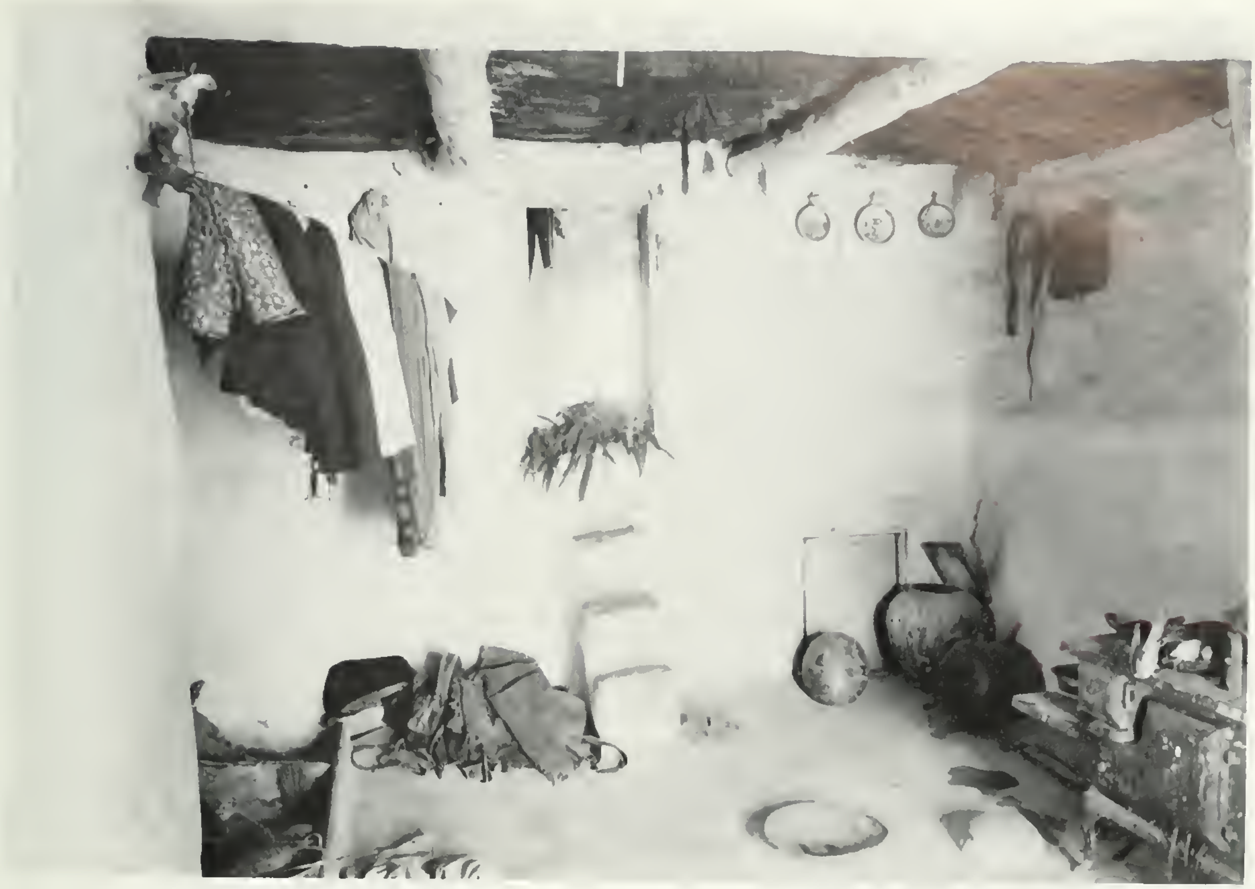
might come to the house threatening to take away the bad child, and it would be only the pleading of the parents and grandparents and the promise of the child to be good that would persuade the monster to withdraw.

Adults, too, are kept in line effectively through gossip, withdrawal of support by kin, and finally, by public ridicule for extreme cases of *kahopi*—*i.e.*, un-Hopi, or unethical—behavior. Since privacy is practically nonexistent in crowded houses and small villages, improper behavior on the part of any individual, child or adult, quickly becomes a matter for public gossip. Teenage boys, who roam the village after dark, might discover that so-and-so was visiting a neighbor while her husband was away overnight at his corn field or with his herd. The next morning the villagers might find a line of ashes drawn between the two houses. Or the clowns, who put on humorous skits as comic relief during public religious ceremonies, might perform a thinly veiled parody of someone who dared to act in an arrogant fashion, causing him to flee the plaza in shame, followed by the mocking laughter of his neighbors. Thus are social harmony and cooperation ensured against egotistical or self-serving acts.

The social world of the Hopi requires cooperation, self-sacrifice, harmony, and balance of power. Child training prepares Hopis for this life, and most people do seek dignity, self respect, and the respect of others through attention to their duties and willing shouldering of their responsibilities. But life is not all responsibility and hard work. There are events that provide drama and excitement, bring gaiety and good feeling into their lives, and express their most deeply held beliefs about the worlds of gods and mankind. There are the ceremonies.

## Hopi Ceremonies

To the traditional Hopi, there is no distinction between the ethical life and the religious life. If people fulfill their responsibilities with a cheerful heart, avoid selfish and sorrowful thoughts, deny self-importance, and turn a humble face



*A room in daily use. On the wall hangs the family's "best china"—painted pottery stew bowls. Near them hang a horse girth and a purchased bread pan, while on the floor stand jars for carrying and storing water. The door behind the jars leads to a basement. Opposite the stove are grinding bins, now used for pottery storage. Above the bins, a pole holds blankets of purchased and native fabrics; at the left hangs a kachina doll. The walls and floor are of adobe and plastered with an adobe wash. The ceiling is of logs and thatch; prayer feathers, to bless and protect the house, hang from it. Horse blankets and tack on the floor indicate that the family owns a horse and is therefore rather vrosperous. (1900 photo)*

toward the world, the supernatural beings will be pleased and pour blessings on them. The Hopis do not so much ask for blessings as fulfill part of the contract with the deities, maintaining harmony in the world so that the blessings can flow freely.

There are several types of spiritual beings, but the most important are the gods and the kachinas. The gods and goddesses of the Hopi pantheon include such figures as Masau, the god of the earth and the underworld of the dead; Muingwa, the young corn god; and Talautumsi, the mother of the game animals. These deities are worshipped with prayers and offerings, and they might appear to someone, but they are generally rather distant.

The kachinas, on the other hand, are very close to people. Hopi legends recount that they once lived on earth and danced in the plaza for the delight of the villagers. But they took offense at human evil and corruption and left, promising to return in spirit whenever the kachina dances are held. They come back to the village from their home in the San Francisco Peaks during the kachina season, bringing with them the clouds and moisture of the mountains. When a man dancing the part of the kachina puts on a mask, the spirit of that kachina enters his body. In this way the kachinas have remained with the Hopi people, entering the village when their dances are held and sending rain and other blessings. The kachinas, representative of all beauty and goodness, bring happiness and festivity when they dance.

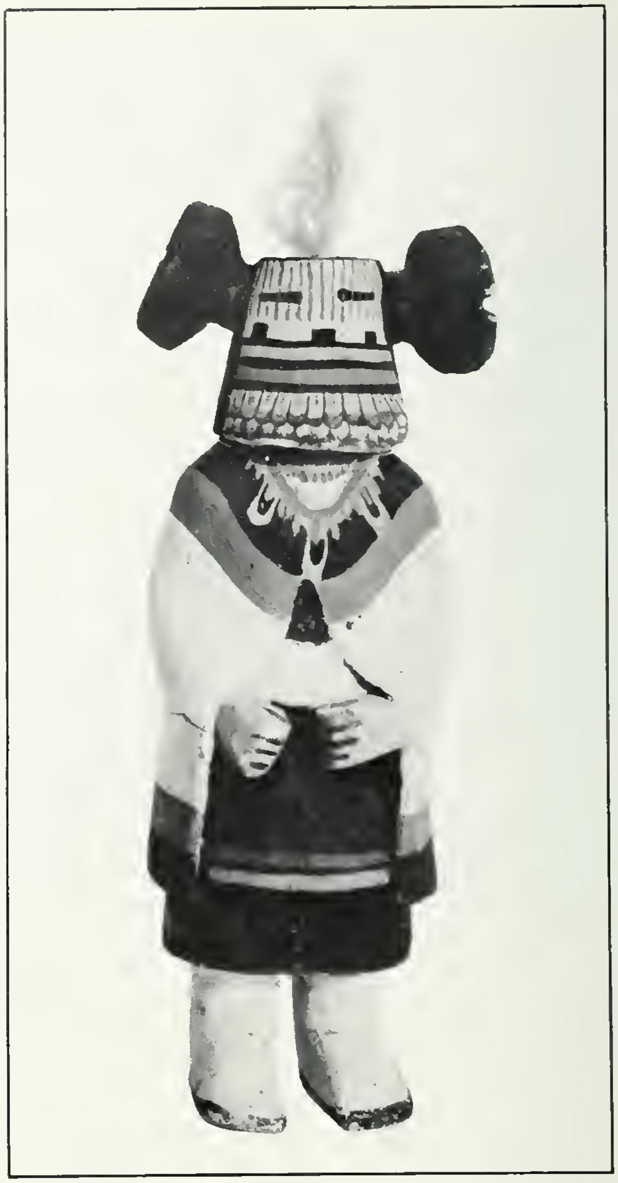
The kachinas take on many forms, each with its own character, from the majestic Ewtoto to the fearsome Soyoko, the beautiful and benevolent Niman, or the comical Mudheads, who are the bawdy and grotesque kachina clowns. Some kachina forms are more popular than others and are more often portrayed in the dances. Preferences change over time. This is also true for kachina dolls, the small wooden dolls presented to girls and women by the kachina dancers at the dances. These dolls are made by men addressed as *father* — real fathers, men of the father's clan, and ceremonial or god fathers — for their "daughters." The doll is not a sacred object but a toy, one that the small girl plays with and the older girl or woman displays on the wall. Since the kachinas bring abundance, these dolls represent a wish or prayer for the girl's fertility and a recognition of the older woman's successful motherhood. It is only fairly recently that the elaborate, expensive dolls have been made, to be treated as art objects as well as gift items.

The kachina dances play an important part in the ceremonial year, but they are by no means the only public ceremonies. The year begins in late November with Wuwucim, the ceremony that celebrates the emergence of the Hopi people from the underworld into the present world. The next important public ceremony, Soyal, takes place in early December. It celebrates the founding of the Hopi villages, and the village chief is its leader.

Shortly after this, the kachinas come back to the village — the kachina dances begin. These winter dances are held at night in the kivas. They are awesome spectacles. People crowd in on benches at the sides and back of the kiva, a large dark chamber lit only by a small fire (nowadays in a Franklin stove). The tinkle of bells and the clank of rattles are heard as the dancers climb down a ladder from the roof into the chamber. If it is snowing heavily, the dancers are covered with soft downy flakes and appear, for a moment, like young eagles. They form a line along three walls. On signal from the dance leader, they shake their rattles in unison, stamp their feet in rhythm, and sing the songs that tell about butterflies, flowers, ripening corn, rain and clouds, and all the objects in the world that speak of life, vitality, and abundance. The masks act as resonators, giving the voices a full, rich, otherworldly quality. At the end of the song they leave to visit another kiva, while a different set of dancers representing some other kachina comes to perform its dance set. Four or five different sets may be performed in one evening. When it is all over the spectators, lulled into a dreamy state by the warmth and darkness of the kiva and the beautiful singing, are sharply brought to alertness as they go out into the crisp, cold night air.

The third major ceremony, Powamuya, is the great kachina festival. Occurring in mid-February, it anticipates the planting of crops. Beans are sprouted in the kivas, and each participant takes home a bundle of bean sprouts from which a special soup is made. The festival itself consists of several separate rituals. The most dramatic is the great kachina parade, when many different kachinas march through the village. The costumes are splendid, each dancer doing his best to represent the inner beauty or grandeur of the kachina by constructing his mask and painting his body with great care and ornamenting himself with elegant turquoise jewelry, feathers, and other paraphernalia.

Some time after Powamuya, when the weather permits, the kachina dances are held out-of-doors in the plaza instead of in the kivas. By mid-July it is time for the kachinas to leave.



*Niman kachina doll, female form*

The Niman is a farewell dance; but the mood is not sad, for the kachinas have promised to return. They show their concern for the people by distributing to the spectators early ripening melons and other good things.

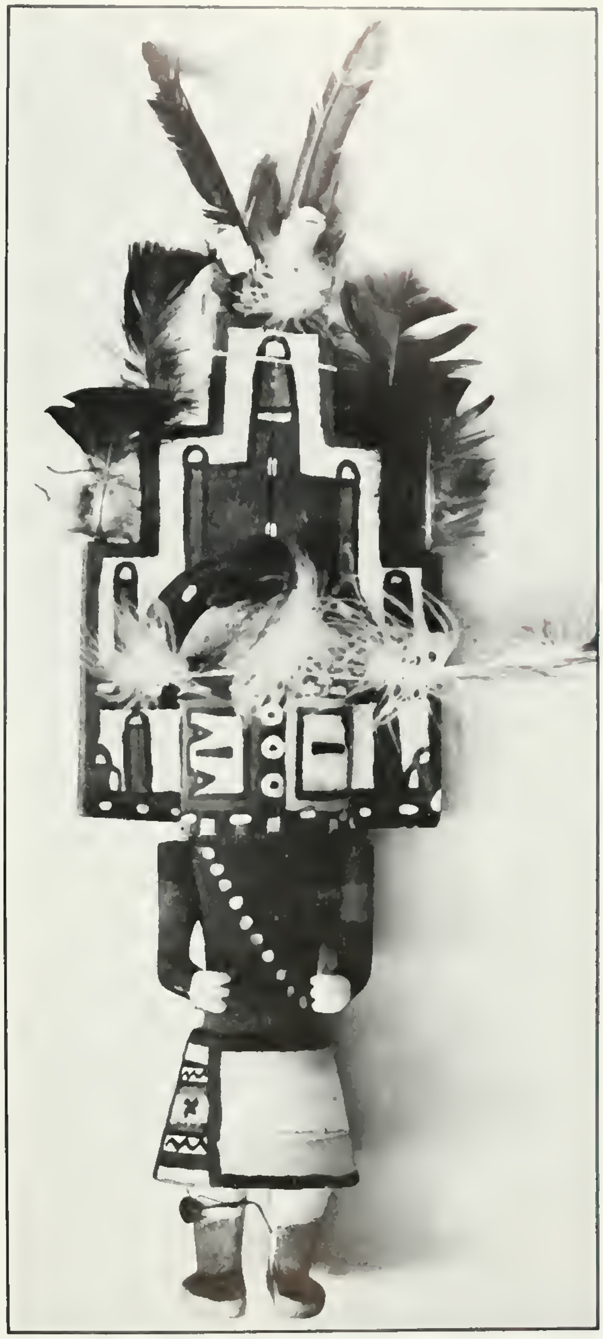
The dances of late summer and fall are put on by individual religious societies. The Flute Dance, a light-hearted dance celebrating life and fertility, alternates annually with the Snake Dance, a somber reminder of warfare and death. The former is performed by the Blue and Gray Flute Societies, the latter by the Snake and Antelope Societies. The three women's societies take their turns putting on ceremonies in September and October. These recognize Mother Earth, from whose body come all wild and domesticated plants and all game animals.

The production of such an elaborate ceremonial cycle makes great demands on people's resources. Everyone in the village is involved at some point as a participant or contributor of food to feed the dancers or distribute among the onlookers. The ceremonial participants must pray, fast, and purify themselves for several days before and after the ceremonies, spending long hours in the kiva for this purpose. Cooperation, self-discipline, and the cheerful assumption of responsibility, the highest Hopi virtues, are constantly put to the test. Life may be difficult, but effort is expended for a good purpose. Through hard work men and women provide for their children and make them happy. Through the self-discipline and self-denial of ceremonial participation, delight and gaiety are brought to the village. By maintaining harmony in the village the kachinas are pleased and shower their blessings on the people. In these ways, throughout his or her daily life, each Hopi contributes to the well-being of others and puts himself in touch with the spiritual beings. This is the root of Hopi self-respect and dignity and the belief that his life has purpose and meaning. "We are all part of the pattern," it is said.

### The Hopi Today

We now skip to the 1980s. Much of the traditional pattern has changed. Men still farm, but wage labor and commercial ranching are more important economically. Women also hold jobs, and hand-ground corn is replaced by machine-ground meal and purchased foods. Children are in school, many going on to college or for technical training. The independent village councils still exist but have been superseded in importance by a tribal council elected by popular vote from all villages. A tribal court settles disputes and tribal police help maintain order. Young families want houses of their own — neat cinderblock structures with plumbing and electricity, instead of the small, simple stone dwellings.

These changes in the economic and political life of the tribe have brought many social changes in their wake. The Hopi see some of them, such as better health and education and larger scope for individual advancement, as good. Other changes, as in family roles and relations, are confusing and can cause much unhappiness. The ceremonies are recognized for their importance in expressing and preserving the old values of cooperation and brotherhood, and people still participate in them actively — although now they are held on weekends so as not to conflict with employment. The tribe is fortunate to have a number of educated individuals who are very conscious of the importance of Hopi traditions and are able to communicate them to the outside world and to the younger generation of Hopis. The Hopis wish to be part of the modern world, but to be so on their own terms. *Pantani* — let it be so. ☐



*A kachina doll representing the Niman kachina. The ears of corn painted on the headpiece symbolize the promise of an abundant harvest to come.*

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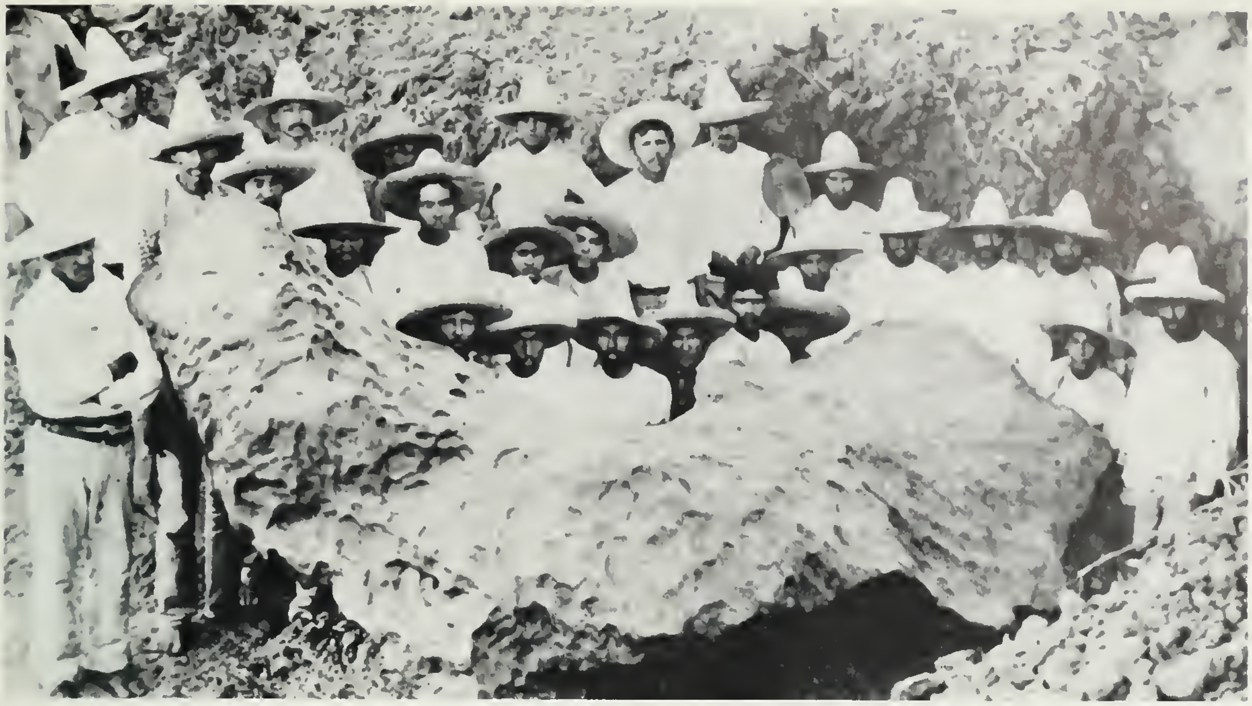
#### Suggested Reading

James, Harry C. 1974. *Pages From Hopi History.* Tucson: University of Arizona Press.

Schlegel, Alice. 1973. "The Adolescent Socialization of the Hopi Girl." *Ethnology* 12:449-462.

Simmons, Leo. 1942. Sun Chief: *The Autobiography of a Hopi Indian.* New Haven: Yale University Press.

Titiev, Mischa. 1944. *Old Oraibi: A Study of the Hopi Indians of Third Mesa.* Papers of the Peabody Museum of American Archaeology and Ethnology, vol. 22, no. 1.



*This 22-ton iron meteorite, discovered on a farm near Bacubirito, Mexico, in 1876, was dug out by the crew of sombreroed men. Today it is on exhibit in a museum in Culiacan, Mexico, but we have a piece of it in the Field Museum.*

thing that could be measured, and then some. The results are startling (but, again, that is a whole other story).

Ten years before, a visitor getting a tour of the Museum storerooms might have asked with some justification, "Why do you keep all those heavy, ugly meteorites? They just take up space and no one ever looks at them." All that changed. Until the late 1950s a meteorite specimen might sell for anywhere from 0.1 cents per gram up to 10 cents per gram (about 45 cents per pound to 45 dollars per pound). By the mid-1960s prices had risen to as high as $25 per gram ($11,300 per pound)! It's common today to discover, in an old catalog, a specimen the Museum purchased for $4 or $5 that is now worth thousands.

Today the meteorite collection of the Field Museum is one of its major assets. There are only five other large collections in the world: British Museum (Natural History), American Museum of Natural History, the United States National Museum, Arizona State University (Tempe), Naturhistorisches Museum-Wien. Between these collections and that of Field Museum, almost all of the world's meteorites are in safekeeping for research, study, teaching, and exhibition.

The question often arises where the Field Museum collection ranks among these six. That's a tough one to answer. If you decide to rate meteorite collections on the basis of weight, then the collection of the American Museum of Natural History in New York City is the largest: it has a single specimen weighing 32 tons! If it had no other meteorite, its collection would still be the largest on that basis. If, however, you decide to rate collections on the basis of the highest percentage of representation of the world's known meteorites, then there are several private collections that would beat out any of the six major collections. One private collector has a very large percentage representation; however, most of his specimens are chips not much larger than sand grains — clearly a useless collection. Some sort of formula could be worked out, probably, that would take into account useful size as well as numbers represented. But this would not be a simple exercise nor would it be worth the effort.

It is enough to say that the Field Museum meteorite collection is among the six best in the world. When Oliver Farrington began to build this collection in 1894, he started something that has grown beyond his wildest expectations. He would be pleased.

*Mr. Harvey Meevers poses with a 49-kg (108-lb.) iron meteorite found near Mapleton, Iowa, in 1939. Almost the entire object is in the Field Museum collection.*

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# *June and July at Field Museum*

*June 16 through July 15*

## New Exhibits

"Hopi Kachina Spirit of Life" and "The Year of the Hopi." These exhibits celebrate America's oldest continuously surviving culture. "Hopi Kachina: Spirit of Life" features Hopi art and artifacts and large-scale models of Hopi religious ceremonies. "The Year of the Hopi" includes rare photographs taken by Joseph Mora in the first decade of this century, before cameras were banned from Hopi public dances. Exhibits curator: James VanStone; designer: Clifford Abrams.

*Contemporary Hopi bowl*

## Continuing Exhibits

Hall of Indians of the Southwestern United States. This permanent exhibit is an excellent supplement to the Museum's special exhibits on the Hopi. In addition to displays on Hopi rituals, the hall contains an exhibit of kachina dolls and archeological materials showing the development of cultures in the Southwest, beginning with the Cochise culture, ca. 5000 B.C. Hall 7, main floor.

## New Programs

Southwest Indian [illegible] Day. A day-long celebration of Native Americ[illegible] of the Southwest. This event complements the current special exhibits, "Hopi Kachina: Spirit of Life" and "The Year of the Hopi," on view through September 8. The day's festivities are planned in conjunction with the Bacavi Community School of Hotevilla, Arizona. The Hopi school children perform social dances in full traditional dress. Traditional crafts such as basket-weaving, belt-making, and kachina carving are demonstrated by Hopi artists. Visitors may watch native foods being prepared and sample piki bread and parched corn. Other features of the day include mini-tours of the Museum's permanent Southwest collections, film programs on Indian culture, and a 2 p.m. slide-lecture, "Prehistoric Hopi on the Colorado Plateau," by Professor Fred T. Plog of Arizona State University. Saturday, June 27, 10 a.m.-4 p.m.

Weekend Discovery Programs. Participate in a variety of free tours, demonstrations, and films every Saturday and Sunday between 11 a.m. and 3 p.m. Check the Weekend Sheet at Museum entrances for film titles, locations, and additional programs.

Ray A. Kroc Environmental Field Trips. These one-day trips to local areas of ecological and biological significance continue on weekends through June. For information, call 322-8854.

Courses for Adults begin the week of June 15, focusing on such varied topics as dinosaurs, Asian medical systems, sociobiology, and science writing. The *Learning Museum* course, "Native American Challengers of the Southwest," will explore a unique segment of American heritage. Participants will learn about the Hopi, the Navajo, and the Zuñi, as well as many other groups that have inhabitated the Southwest. Advance registration by mail is required. For information, call 322-8855.

Summer Fun. Children ages 5 to 12 can explore the world of natural history through workshops on 25 different topics, from Indian sand painting to African flute-making. Tuesdays through Saturdays in July, beginning July 7. For information, call 322-8854.

## Continuing Programs

Volunteer Opportunities. Individuals with scientific interests and backgrounds are needed to work in various Museum departments. Contact the Volunteer Coordinator, 922-9410, ext. 360.

June and July Hours. The Museum is open from 9 a.m.-6 p.m. Saturday-Thursday; 9 a.m.-9 p.m., Friday throughout the year.

The Museum Library is open weekdays 9 a.m.-4 p.m. Obtain a pass at the reception desk, main floor. Closed July 3 for Fourth of July.

Museum Telephone: (312) 922-9410

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# FIELD MUSEUM OF NATURAL HISTORY BULLETIN

NATURAL HISTORY SURVEY
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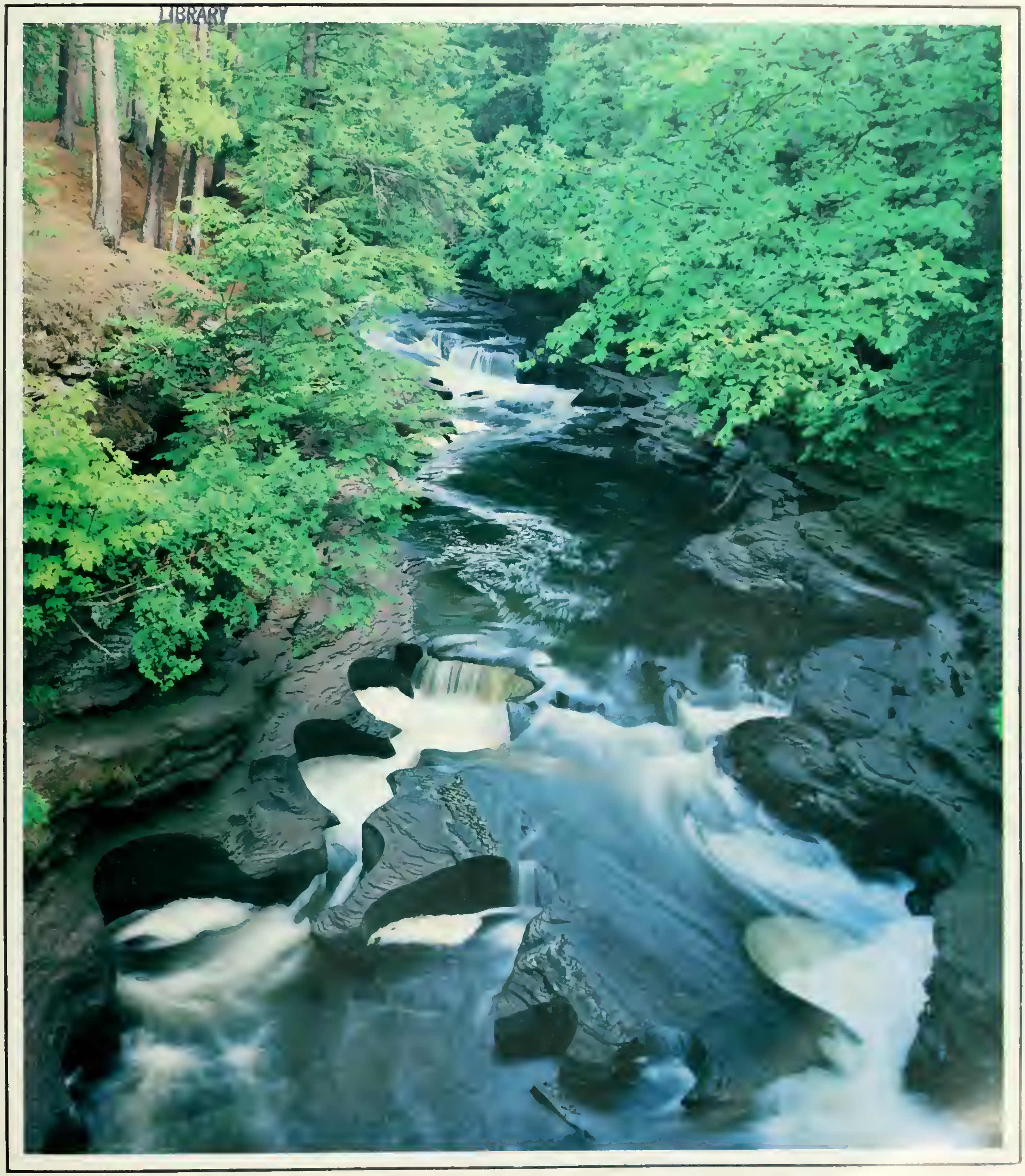

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*Upper Presque Isle River, Porcupine Mountains, in Michigan's Upper Peninsula. Photo by Bob Brudd, of Tinley Park, Illinois.*

# The Frasnian-Famennian Extinctions: A Search for Extraterrestrial Causes

*by* GEORGE R. McGHEE, JR.

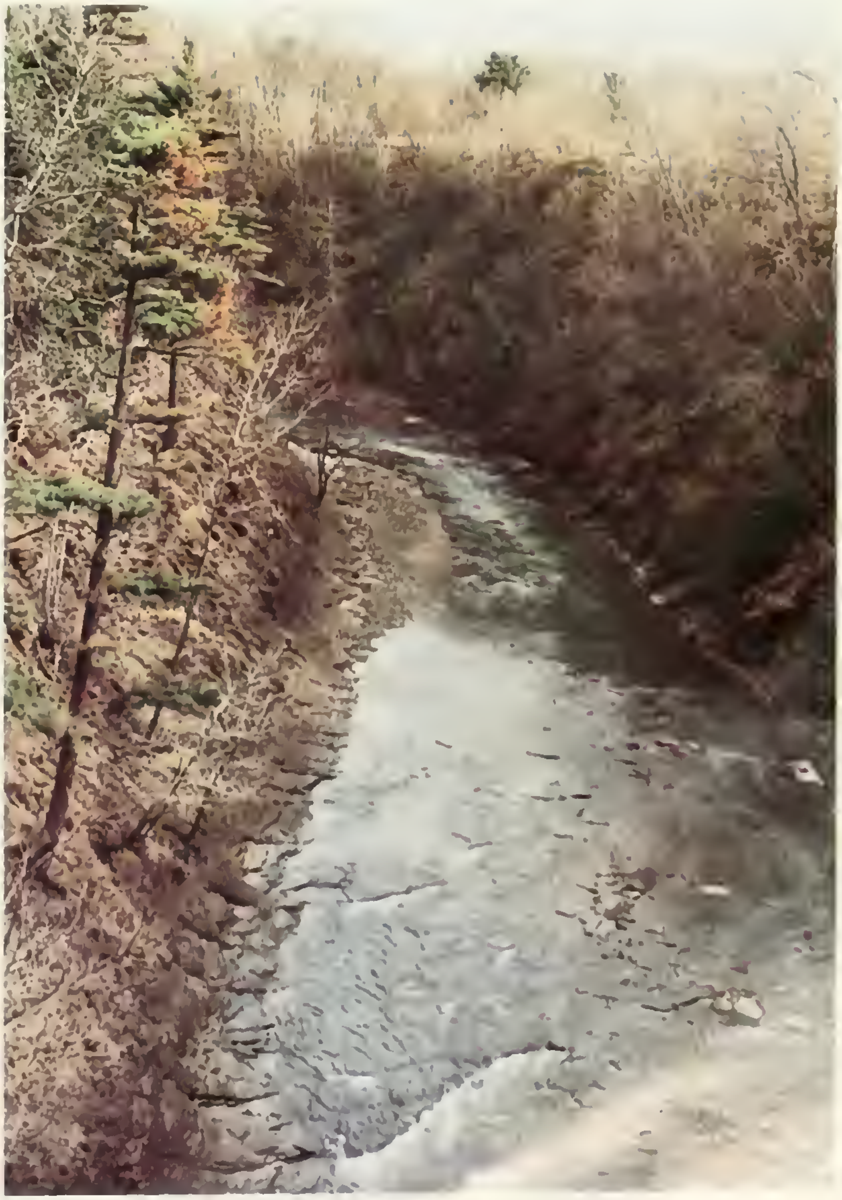
*photos by E.J. Olsen*

Three hundred fifty-five million years ago a crisis occurred in marine ecosystems throughout the world. Hundreds of species of marine organisms became extinct. Other groups of animals and plants, successful and numerous for millions of years, suffered severe decimations, through which very few members survived.

This crisis in the history of life is called the Frasnian-Famennian extinction event, or the "F-F" boundary extinction. The Frasnian and the Famennian are two epochs of geological time, which together comprise the Late Devonian—a period which spanned from 360 to 345 million years ago. Shallow tropical seas were widespread in the Frasnian epoch, climates were equable, and marine life flourished.[1] Reefs consisting of coral and stromatoporoids (an ancient group of peculiar sponges) spanned the world—indeed, the Devonian reef complexes may have been the largest and most widespread of all time, including the present. Warm shelf seas were populated with diverse and cosmopolitan faunas of brachiopods, ammonoids, trilobites, echinoderms, and molluscs. In contrast, only a tiny remnant of the diverse and abundant Frasnian marine life survived to be represented in the extremely impoverished fauna of the Famennian epoch—which immediately followed the Frasnian.

All over the world, marine animals disappeared on a colossal scale at the end of the Frasnian. It has been estimated that over 60 percent of existing marine taxa (species and higher taxonomic units) were extinguished during the Frasnian-Famennian event.[2] Reef complexes, so numerous and widespread previously, suffered near-global termination. Benthic ecosystems (composed of animals and plants living on the sea bottom) were particularly hard hit. The most abundant forms of shellfish in the Frasnian were the brachiopods, or "lampshells." Approximately 86 percent of all brachiopod species died in the F-F extinction event. Three entire superfamilies of brachiopods vanished from the earth. Trilobites—primitive marine arthropods—were almost wiped out. All of the exotic and spiny trilobites were lost; only one superfamily of rather

*Thick sequences of Devonian shales are exposed in the Walnut Creek Gorge, near Silver Creek, New York*



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*George R. McGhee, Jr., assistant professor of geological sciences, Rutgers University, is on leave at Field Museum under the Museum's Visiting Scientist Program.*

*Phobos, one of the two moons of Mars. The surface shown here, about 12 by 14 miles across, is possibly twice the size of the asteroid that may have impacted the Earth some 355 million years ago. (Photographed at range of 380 miles on Oct. 19, 1978, by Viking Orbiter I.) Courtesy* NASA

simple forms survived. Coral faunas were decimated in what was the single most fundamental change in reefal ecosystems in the Paleozoic era. The stromatoporoids and receptaculitids (primitive marine plants) almost became extinct—only much later in the Carboniferous did the stromatoporoids recover even a shadow of their former numbers, and receptaculitids remained rare throughout the remainder of the Paleozoic. Other bottom-dwelling mollusc and echinoderm groups also were affected by extinctions.

Extinctions, while perhaps most severe in the benthos, affected the totality of Frasnian marine ecosystems. In the zooplankton (animals which live in the water column) the cricoconarids were extremely abundant during the Frasnian. These small cone-shaped fossils (of uncertain affinities, perhaps related to modern pteropods, or "sea butterflies," a type of mollusc) can be found scattered by the hundreds across fossil bedding-plane surfaces of Frasnian age. By the end of the Frasnian they are extinct. Ostracodes, conodonts, and chitinozoans also sustained high losses at this time. In the phytoplankton (microscopic plants which live in the water column), the acritarchs suffer almost total decimation. In the nekton (larger animals which swim), the ammonoids, and early armored fishes lost many groups. In essence, the global marine ecosystem collapsed, or rather "crashed," at the end of the Frasnian epoch.

Paleontologists have puzzled for years on the possible causes of such an abrupt and devastating deterioration of the ecosystem. Theories abound—it has been suggested that perhaps the level of the oceans of the world dropped suddenly at the end of the Frasnian, shallow seas drained off of the continents and the global extermination of shallow marine animals and plants resulted. Widespread glaciation can cause abrupt (geologically speaking) marine regressions, yet there is no firm evidence for major glaciation during the Frasnian.

Perhaps instead the Frasnian world underwent a period of global cooling and climatic deterioration, such that the diverse tropical faunas, unable to adapt, died out, to be replaced by the sparser, more hardy cold water biota of the higher latitudes. It has also been suggested that periodic extinctions in the phytoplankton decreased rates of oxygen production from marine plants and drastically lowered oxygen levels in the world's oceans—or, alternately, that such large shallow seas were particularly susceptible to stagnation and, thus, oxygen depletion. The list of proposed causes is almost endless.

Just over a decade ago, Canadian paleontologist D.J. McLaren, in a presidential address to the Paleontological Society, suggested that perhaps the earth was impacted at the close of the Frasnian by a giant meteorite.[3] He reasoned that such a meteorite, falling into one of the Frasnian oceans, could have generated an enormous tidal wave (perhaps on the order of one to two miles high). Such a shock would have been global in nature, and devastating in effect.

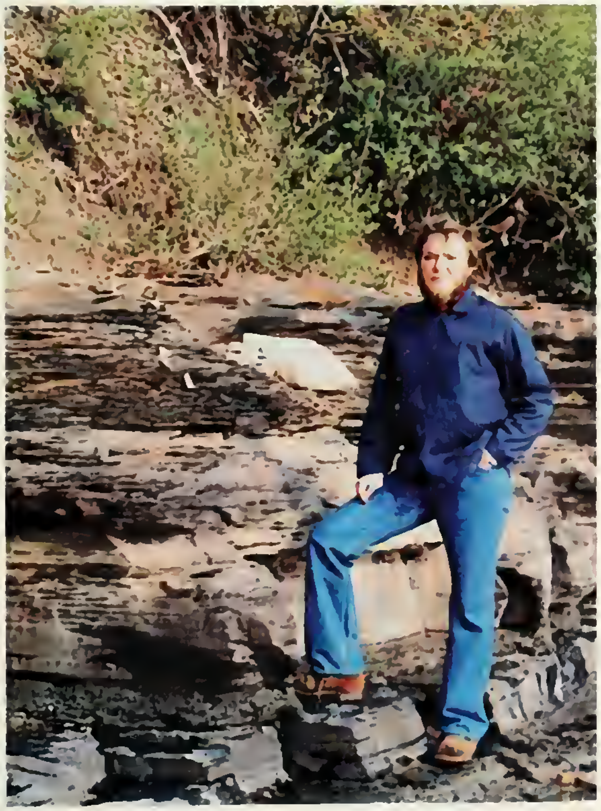
At first ignored, or in some cases ridiculed as a return to catastrophism—this idea is now being taken quite seriously by a variety of scientists, though for an entirely different extinction event. Sixty-five million years ago, at the close of the Mesozoic era, well over half of the earth's species in the oceans and on the land abruptly disappeared in the fossil record. This event, named the Cretaceous-Tertiary (or "C-T") boundary extinction, has attracted considerable attention due to the well-known extinction of the dinosaurs at this time. Unlike in the Frasnian, Cretaceous terrestrial ecosystems were evolutionarily complex and well developed, and suffered simultaneous disruption with marine ecosystems at the C-T boundary.

Several teams of scientists have now marshalled geochemical evidence to suggest that the earth was indeed impacted by a giant meteorite —an asteroid, in fact—exactly at the end of the Cretaceous Period.[4] [5] It is estimated that the asteroid may have been as large as 7 miles in diameter, hit the earth at roughly 60,000 miles per hour, and produced a pall of fallout and dust that would have shrouded the earth for years.[6] The effects on the biosphere of the earth would have been truly catastrophic.

Evidence of such an impact consists in the enrichment—well beyond terrestrial standards —of particular trace elements in rocks which occur at the C-T boundary. These trace elements (iridium, osmium, gold, platinum, rhenium, and others) are reliable indicators of meteorites; it was even found that their relative proportions in C-T boundary clays are virtually identical to those found in typical carbonaceous meteorites.

The debate concerning an extraterrestrial cause for the Cretaceous-Tertiary extinction is by no means closed. It is still not clear just exactly how much ecological and climatic damage such an impact would produce. One way of testing the proposed connection between asteroid impacts and major extinctions would be to search for the geochemical signature of such an impact in association with another major extinction event.

*Author George R. McGhee stands on the transitional contact between the Hanover Gray Shale and the Dunkirk Black Shale at the shore of Lake Erie in New York State. Within these strata lies Frasnian-Famennian boundary.*



*Interbedded layers of the Dunkirk Black Shale and Hanover Gray Shale. Did an asteroid strike the earth during the deposition of these shales and muds 355 million years ago?*

It is with this potential test in mind that I, a paleontologist, and Edward J. Olsen, a meteoriticist and curator of mineralogy at Field Museum, recently travelled to western New York State to sample Devonian shales and mudstones which span the Frasnian-Famennian boundary. During the Late Devonian much of eastern North America was covered by large shallow seas, and the ecology of these regions is well known.[1] Chemical analyses of the field samples are being conducted by R. Ganapathy of the J.T. Baker Chemical Company in Phillipsburg, New Jersey, who has previously analyzed samples from the Cretaceous-Tertiary boundary.[5] We hope soon to be able to answer the question posed by D.J. McLaren over 10 years ago: Was the Frasnian-Famennian ecological "crash" triggered by an asteroid impact?

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*Sunday afternoon on the Colorado River*

# William Henry Jackson

## *Historian with a Third Eye*

by Audrey Hiller, *Field Museum Volunteer*

"Father of the Picture Postcard" is a dubious sobriquet at best, but to be hailed as a major influence in the establishment of the U.S. national park system is something else. Pioneer photographer of the West, William Henry Jackson (1843-1942) earned both titles during his remarkable long, productive life. Jackson's beginnings and those of commercial photography were concurrent, and the development of camera technique, particularly in outdoor photography, is much indebted to Jackson's contribution.

More than 100 photographic lantern slides by Jackson are in the archives of Field Museum; all or most date from before the Museum's founding in 1893. Because the slides are still in the binding of the W. H. Jackson Company, of Denver, their dates can be bracketed with certainty between 1879 and 1897, the period during which that firm was in business. Some of the slides, however, may be from negatives he made when with the United States Survey Expedition in 1871 or on earlier excursions along the newly laid railroad lines of the West.

The Museum's entire collection of lantern slides (the 3¼ x 4-inch glass slides used in early projectors before the advent of motion pictures) numbers about 10,000. Most are from photos taken during expeditions of various sites around the world, or of artifacts; and the great majority are still unclassified, uncataloged, and uncopied—tasks that are not likely to be finished until special funding becomes available.

Jackson is credited with being the first photographer to record Yellowstone's geological and scenic wonders, its hot springs and geysers. While accompanying the Hayden Geological and Geographic Survey through Wyoming in 1871, he documented for archeologists and geologists an almost inaccessible part of the West. His photographs achieved great popularity in the 1870s, were widely copied as wood engravings, and sold to an enthusiastic public that was especially taken with his novel scenes. Portfolios of his Yellowstone prints sent to members of Congress played an important part not only in continuing and funding Hayden's survey of uncharted regions, but also in convincing Congress in 1872 to set aside Yellowstone as our first national park.

In those years—during the very infancy of field photography—logistical and mechanical problems posed great difficulties. Using the then current collodion process, the photographer had to make his own sensitive plates in the field. As described in *William H. Jackson,** by Beaumont Newhall and Diana Edkins: "In a portable darkroom—usually a tent or wagon fitted out for the purpose—(the photographer) coated a glass plate with collodion, a viscous solution of nitrocellulose to which a halide salt such as potassium iodide had been added. While the coating was still tacky, the plate was plunged into a solution of silver nitrate; within minutes, light-sensitive silver salts were formed in suspension in the collodion coating. The plate, while wet, was put into a light-tight holder and immediately exposed in the camera, which stood waiting on its tripod, already focused on the scene. Without delay, the photographer dashed back to the dark tent and developed the latent image before the sensitive coating had dried. He then fixed and washed the plate."

Jackson's equipment for routine work weighed 300 pounds and was carried by a mule; but when, in 1869, he toured the West for three months along the newly laid rails of the Union Pacific, he had a ton of equipment, including two cameras: one for 8 x 10 negatives and the other for stereoscopic pictures. It is probably on these stereoscopic views that Jackson's picture postcard fame rests. Following this trip, he sold 10,000 stereoscopic photos to one New York firm alone.

Historical Pictures Service, Chicago

*William Henry Jackson in his later years.*

The mountains, canyons, cowboys and Indians, captured by Jackson's camera, could be viewed in living 3D. Before the halftone method of photo reproduction came into use, stereo views in postcard format were the rage. Every home had its hand-held stereopticon for viewing the cards.

Jackson was at the right place and time—at the transcontinental joining, in Utah, in 1869, of the Union Pacific and the Central Pacific railroads—to record what the miner, farmer, or cattleman might see in the vast, little known region of the West. Jackson's work caught the attention of Ferdinand V. Hayden, the geologist in charge of the geographic survey being undertaken at this time by the U.S. government. Jackson's association with Hayden lasted eight highly productive years.

Before joining Hayden's team, Jackson was not a landscape photographer and had no particular scientific or esthetic interests. Born in Vermont in 1843 of an artistic mother, who taught him his basic art skills, he worked for a photo studio in Rutland, Vermont, before enlisting in the Union army. During the Civil War, which he spent in Washington, D.C., his duties included sketching camp life. With the war's end (which coincided with a broken romance), he headed west, first hoping to be a prospector, then signed on as an ox-team driver in a train of westbound freight wagons. This marked his introduction to the West.

With Omaha as a base, he and a brother went into business as photographers, shooting everything in range: portraits, Indian lodges, storefronts, whatever the public would buy; and

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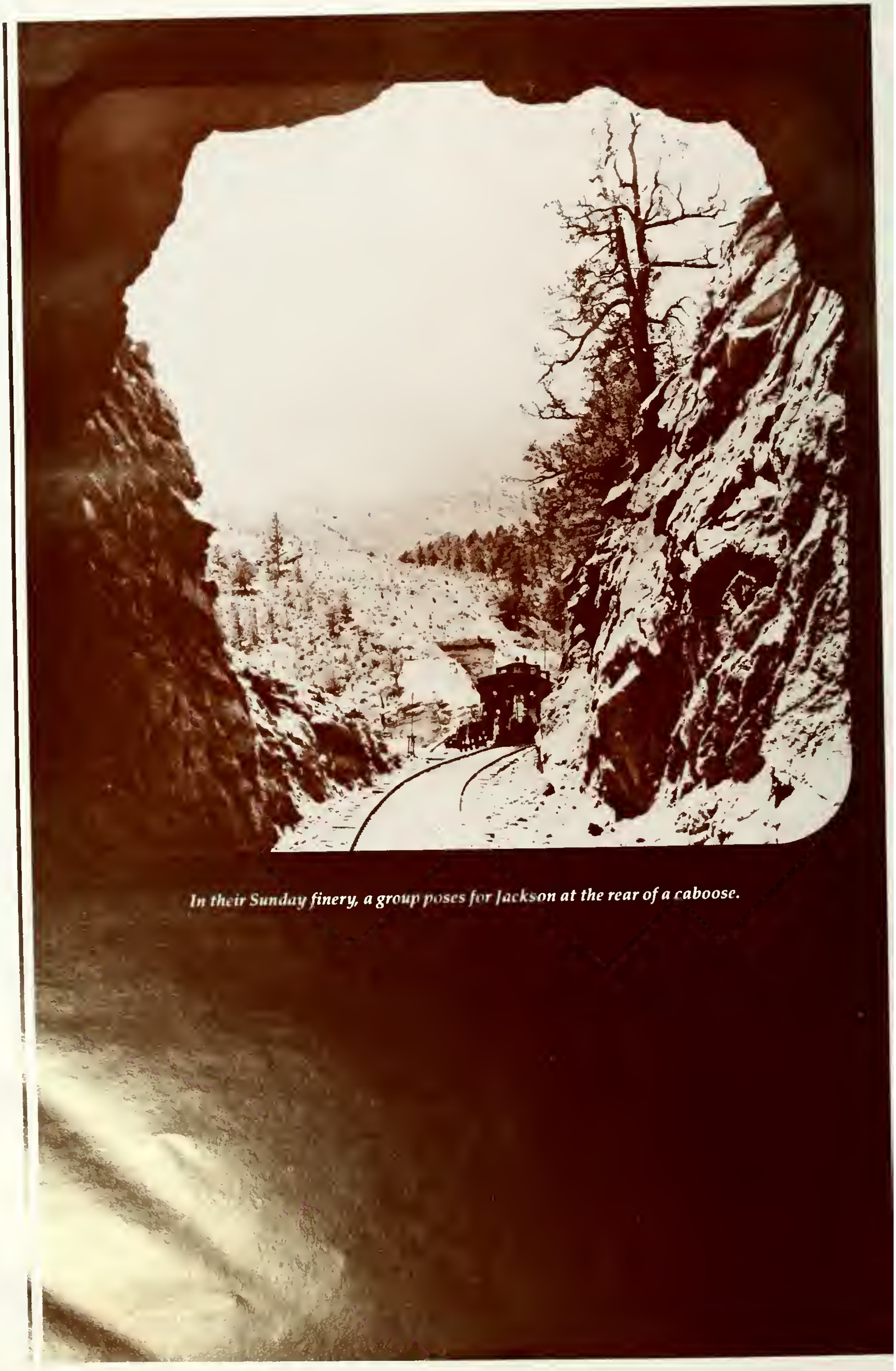
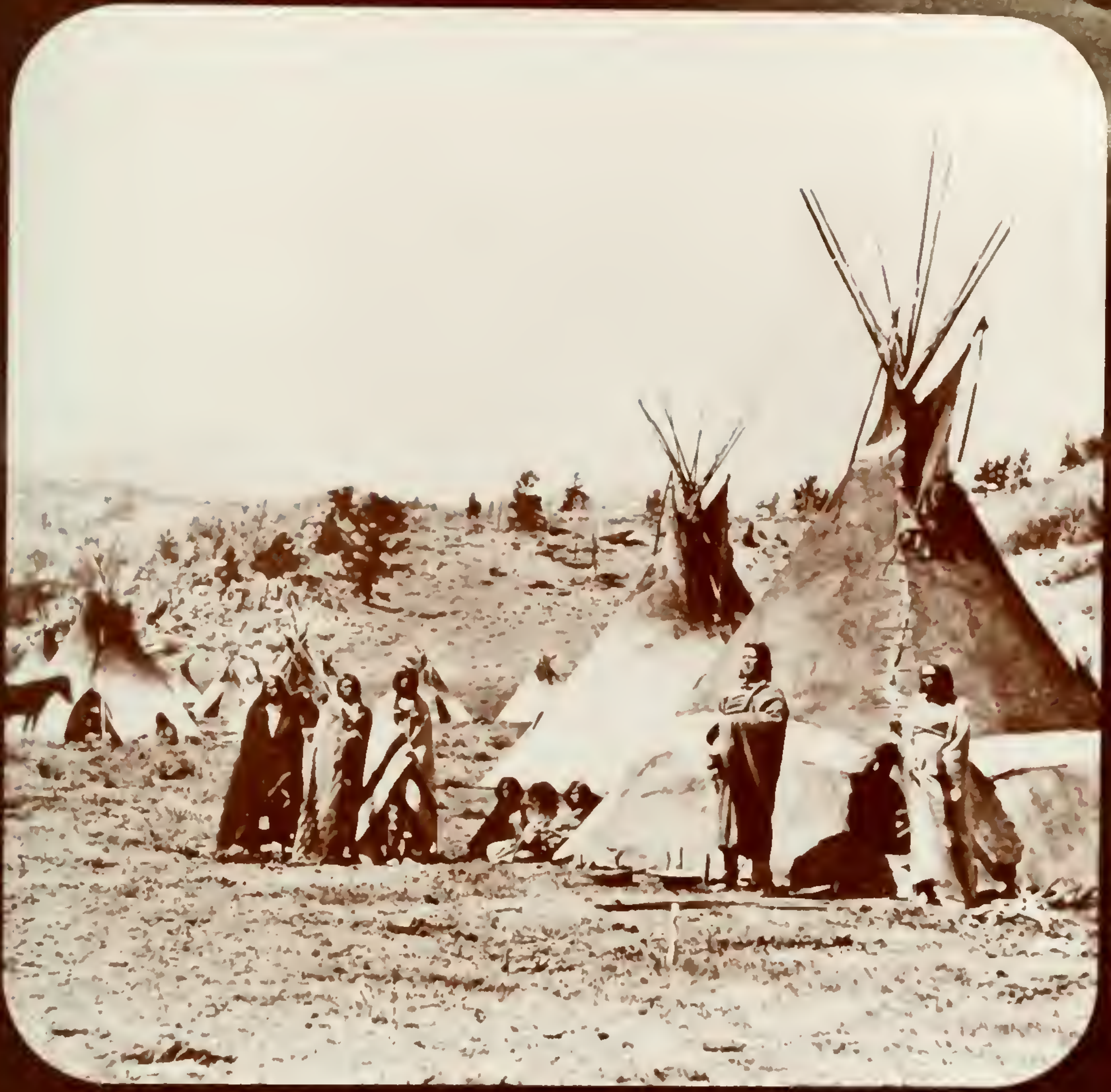
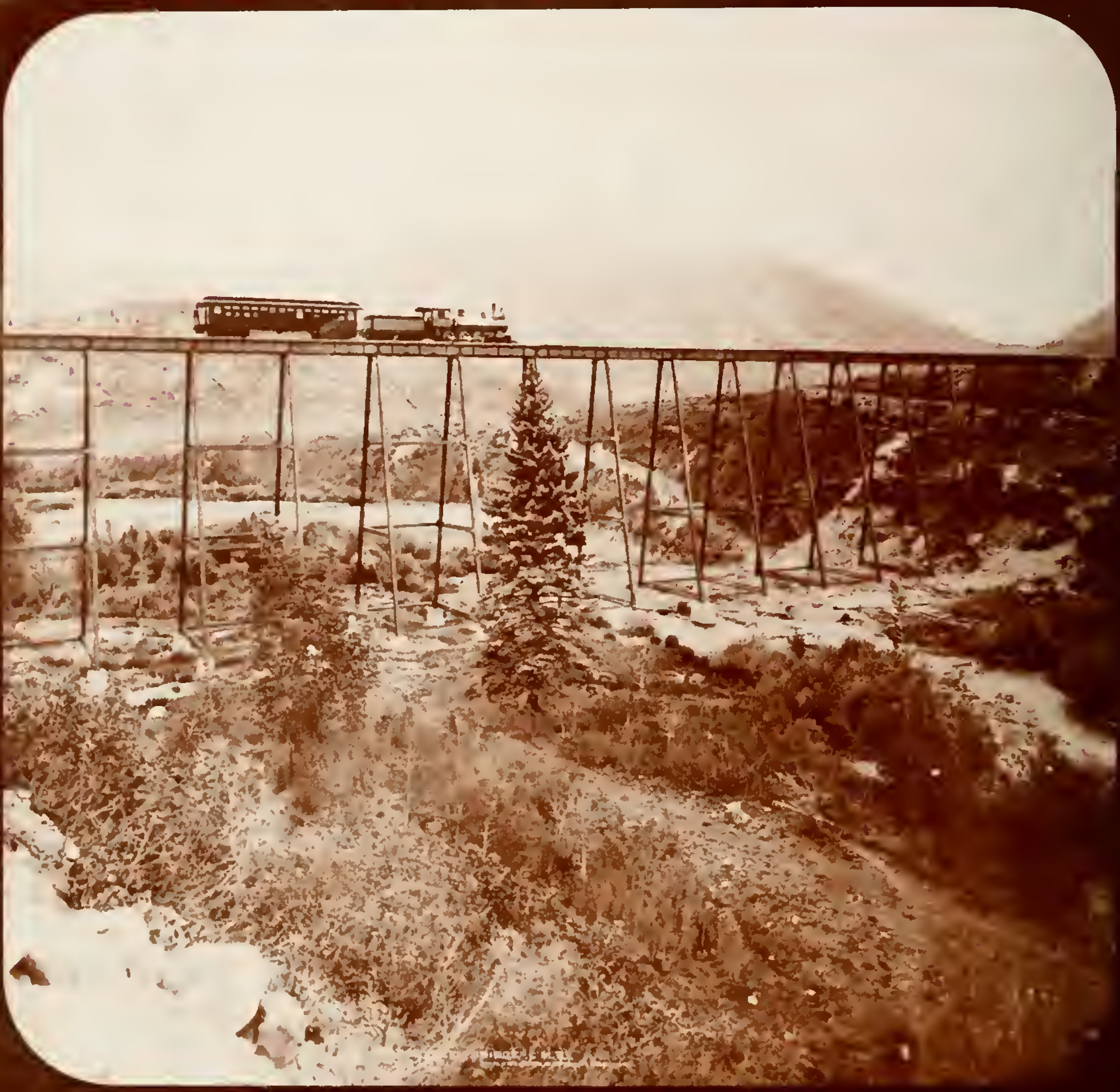
*New York and Fort Worth, 1974



*In their Sunday finery, a group poses for Jackson at the rear of a caboose.*



*Ute encampment*



Maroon Green Bridge

he came to realize that his true calling was that of outdoor photographer. With A. C. Hull as a partner, along the new railroad routes, he began operating as a self-styled "journalist working with a camera."

With [illegible] its fascinating detail, Jackson's own autobiography* reads like a history of the American West. He recounts missing a train out of Omaha because his time and that of the railroad were out of sync; there was then no "standard time." U.S. time zones were not established until 1883, at which time representatives of 35 railroad companies met to resolve the matter in Chicago. Within a year, private businesses also adopted the efficient system worked out by the railroads, with city and state government falling in line shortly thereafter.

Having learned of Jackson's work, Hayden visited him at his Omaha headquarters. Determined to "inform Americans about America," as he put it, the head of the Geological Survey saw Jackson's photos of the railroads and the American Indians as a way of doing just that.

Hayden could not immediately afford to hire Jackson, but the photographer joined his team

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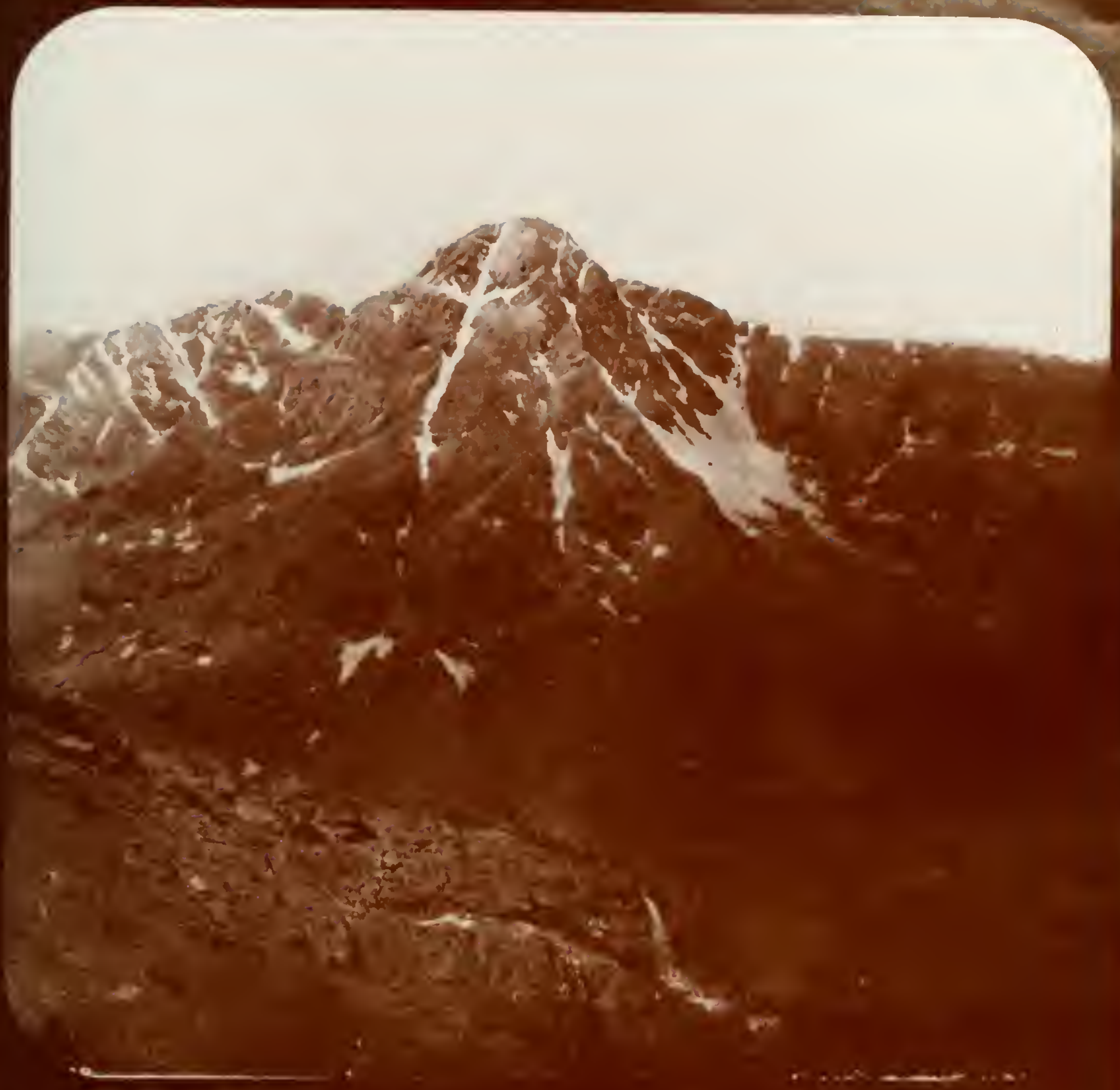
**Time Exposure, the Autobiography of William Henry Jackson.* New York, 1940.

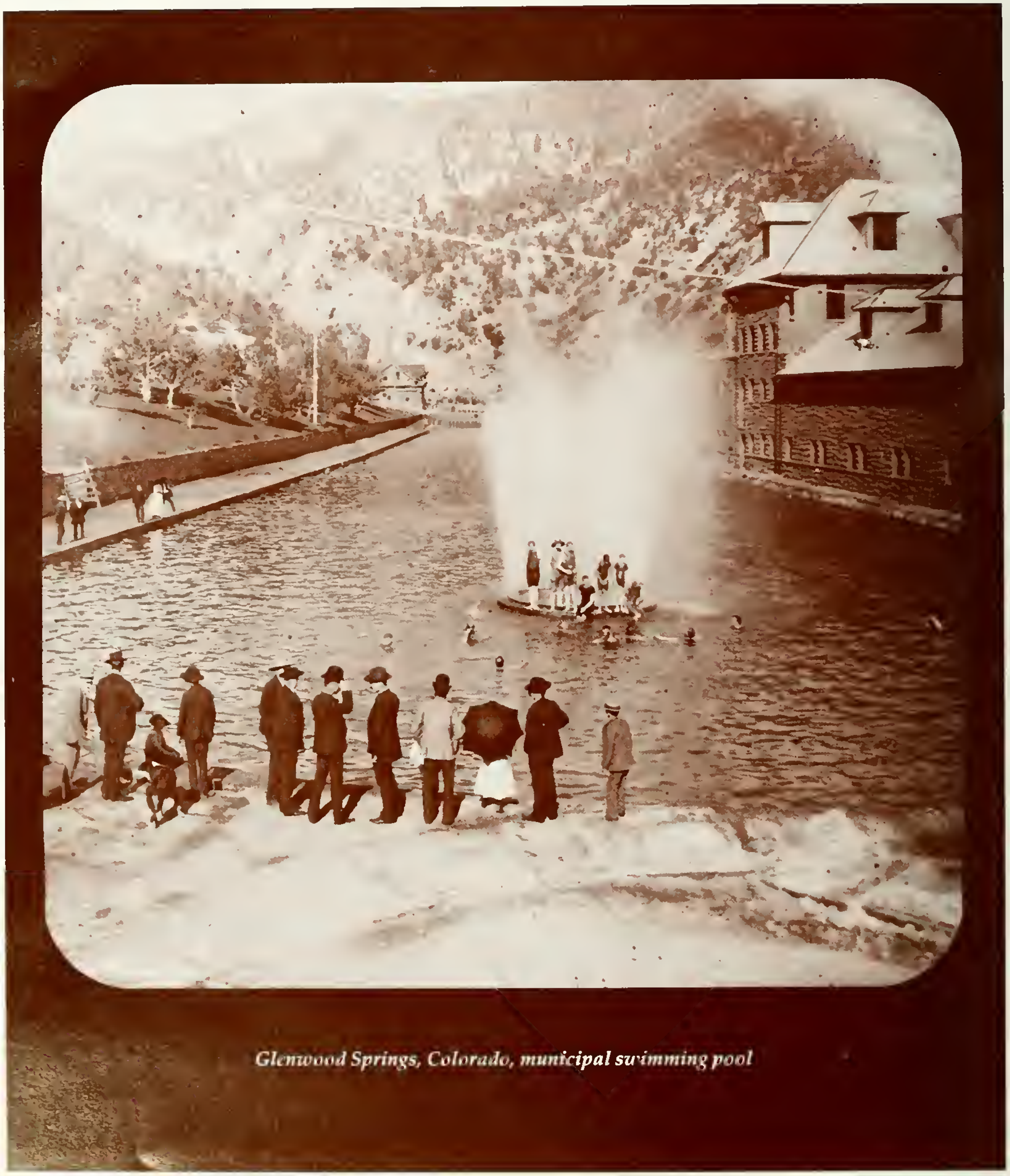


*Mountain of the Holy Cross (1873). To take this shot Jackson lugged his photo equipment on his own back up the last 1,500 feet of neighboring Notch Mountain. He processed his negatives on the spot, using melted snow for wash water.*

anyway, as a volunteer, in 1870. The following year he was added to the payroll. Jackson later termed his survey experience from 1871 to 1879 as "priceless—it gave me a career."

Also on Hayden's team were artists—first S. R. Gifford, then Thomas Moran—who helped Jackson sharpen his own esthetic sensibilities. For scale and other effects, he learned to pose figures in his landscapes, and Moran appears as that figure in some of Jackson's work. Intrigued by tales of a legendary "Mount of the Holy Cross," Jackson went in search of it in 1873 while on a survey trip across the eastern slope of the Rockies. He found the peak: a 14,000-footer with two main fissures that intersected, like a cross, gleaming white with snow in winter.

He shot a spectacular view from the summit of neighboring Notch Mountain, but only after lugging the camera equipment without the aid of pack animals, up the last 1,500 feet. Once atop Notch Mountain, Jackson was again thwarted. Clouds rolled in and he was obliged to wait until morning to snap his shutter. But the results are among Jackson's most memorable. Jackson took eight glass plate shots of the mountain (from stereos to 11 x 14-inch) and processed the negatives on the spot, using melted snow for wash water. Thomas Moran's painting of the Holy Cross based on Jackson's work added to the fame of the photographs.



*Glenwood Springs, Colorado, municipal swimming pool*

During that era, photo enlargers were not commercially available, so most nineteenth-century prints were contacts, *i.e.*, the same size as the negatives. That Jackson was able to transport these huge brittle plates (sometimes even 28 x 36-inch ones) under the most difficult circumstances makes his achievement all the more remarkable.

Jackson had two opportunities to photograph Indian tribes: early in his career, near Omaha and later in 1874 with the Hayden Survey, when he visited the Los Piños Indian agency. He also recorded the remnants of lost Indian civilizations and their cliff dwellings in the Southwest in 1874 and 1875. In 1875 he photographed the Moquis pueblos.

When the Hayden Survey ended in 1879, Jackson struck out on his own, establishing the Jackson Photographic Company, in Denver. To stimulate travel, western railroads hired him to take pictures along their routes—a 15-year involvement during which he produced 30,000 negatives. The Denver and Rio Grande Railroad provided him with a special train with a flat car as a photo-taking platform. He photographed mining towns—Leadville, Telluride, Cripple Creek—and the railroads that competed to serve the mining areas until the mines ran out.

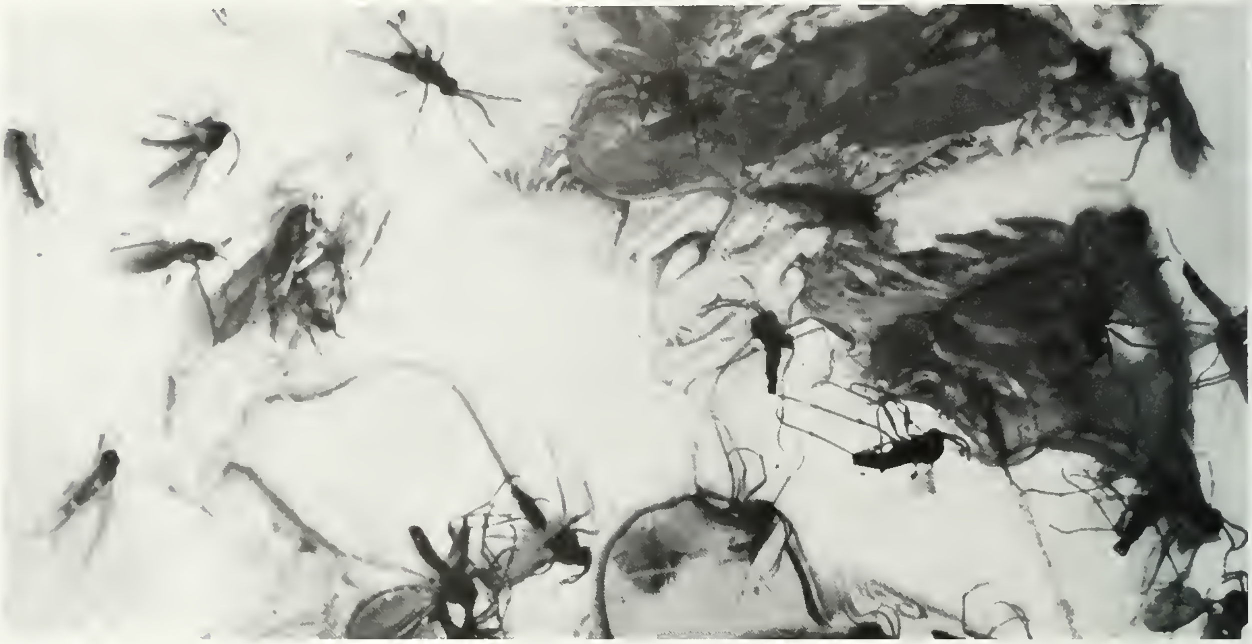
*Engines in tandem were often used on steeper grades.*

During this time he began making photographic enlargements. Experimenting with new equipment was typical of Jackson throughout his career. He photographed Chicago's Columbian Exposition in 1893 and toured the world in 1894 for the World Transportation Commission. Jackson left Denver for Detroit when he sold his negatives to the Detroit Publishing Company, becoming a partner in the firm. Estimates of his total accumulation of negatives have been set at 80,000.

In his later years, Jackson worked and traveled for the Oregon Trail Memorial Association as its research secretary, revisiting his old haunts and giving talks at meetings from New York to Oregon. Now in his eighties, he had progressed to a smaller "vestpocket" camera, as he called it, doing paintings from these photos when he returned to his home base in Washington, D.C. In his final years, he was hired by the Department of the Interior to plan and supervise the painting of a series of murals for its new building in Washington, murals memorializing four major survey parties in the West.

Before dying at age 99 in 1942, Jackson attributed his long life to inheriting a sturdy constitution, doing interesting things and looking forward to doing more.

# The Kohlman Amber Collection



*Swarm of flies, family Sciaridae*

# *A Stained Glass Window to the Past*

*by* GENE KRITSKY

Fossilized resin, commonly known as amber, is prized for its gem value, but the scientific importance of this beautiful burnt-orange substance is primarily for the tiny plants and animals that we occasionally find in it; the anatomical details of such fossils may be preserved with remarkable clarity and fidelity.

*The author with portion of the Kohlman Collection, mounted on slides.*

Dave Walsten

Field Museum's Kohlman Amber Collection, numbering about 2,200 original pieces (before some were fragmented for better analysis) and purchased by the Museum in 1953, is one of the finest collections of amber fossils in the world. Originally the collection was assembled by A. F. Kohlman, a railroad dispatcher who lived in Milwaukee and later Racine, Wisconsin. Kohlman acquired the collection between 1900 and 1915, a conclusion we have drawn from newspapers, letters, and various notes found in the boxes containing the specimens. We also know from these papers that Kohlman obtained the amber from W. Herrin, of St. Louis. Herrin was also the source of the other major amber collection in the United States: that of Harvard University's Museum of Comparative Zoology.

Following Kohlman's death, his sisters placed his other personal effects up for public auction, but they were obviously unaware of the scientific value of the collection, and had even thought of throwing it away. By a stroke of good luck, however, a Racine high school science teacher, F. E. Trinklein, discovered the boxes of "trash" when he attended the auction to bid on

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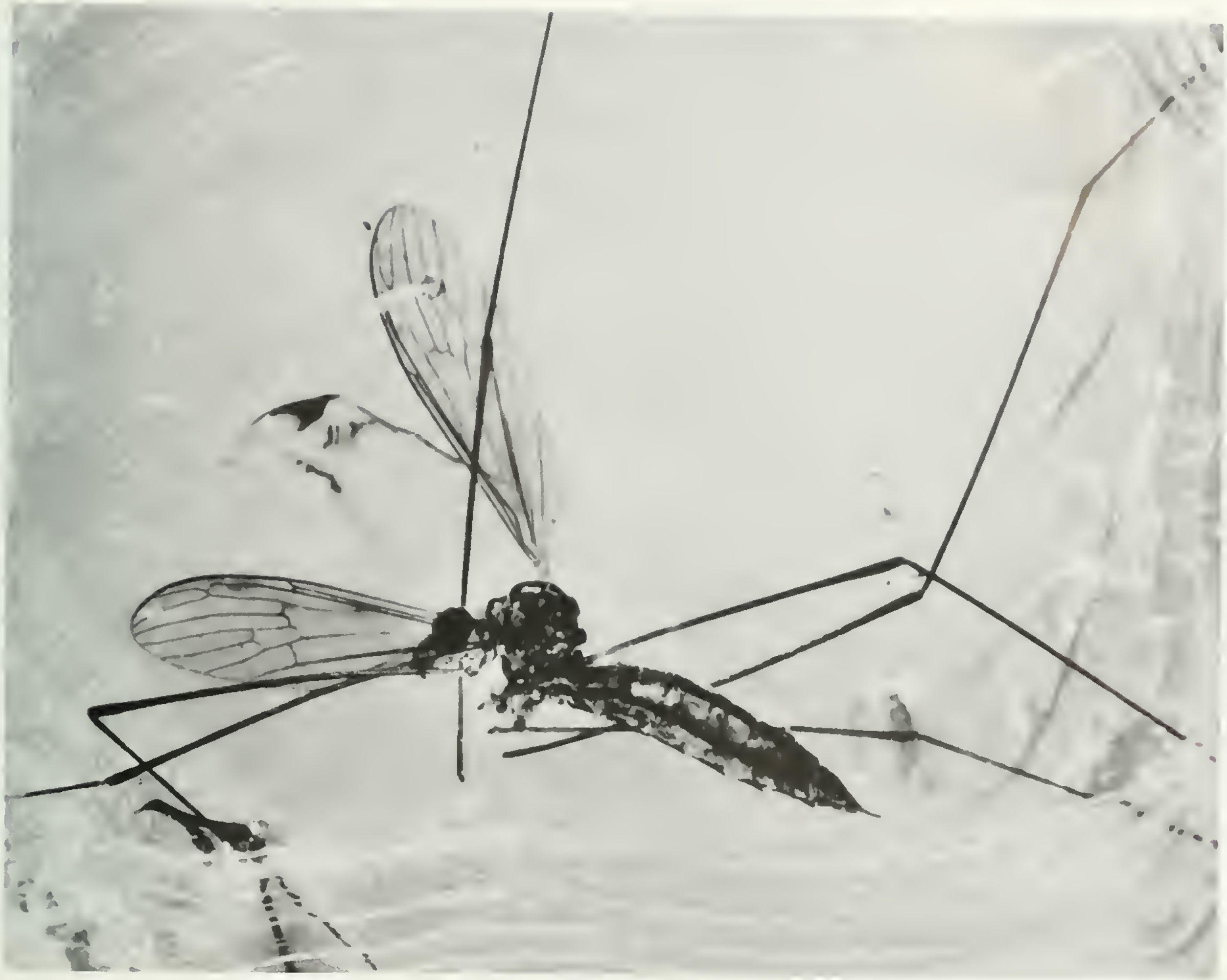
*Gene Kritsky is associate professor of biology at Tri-State University, Angola, IN.*



Crane fly (Tipulidae)

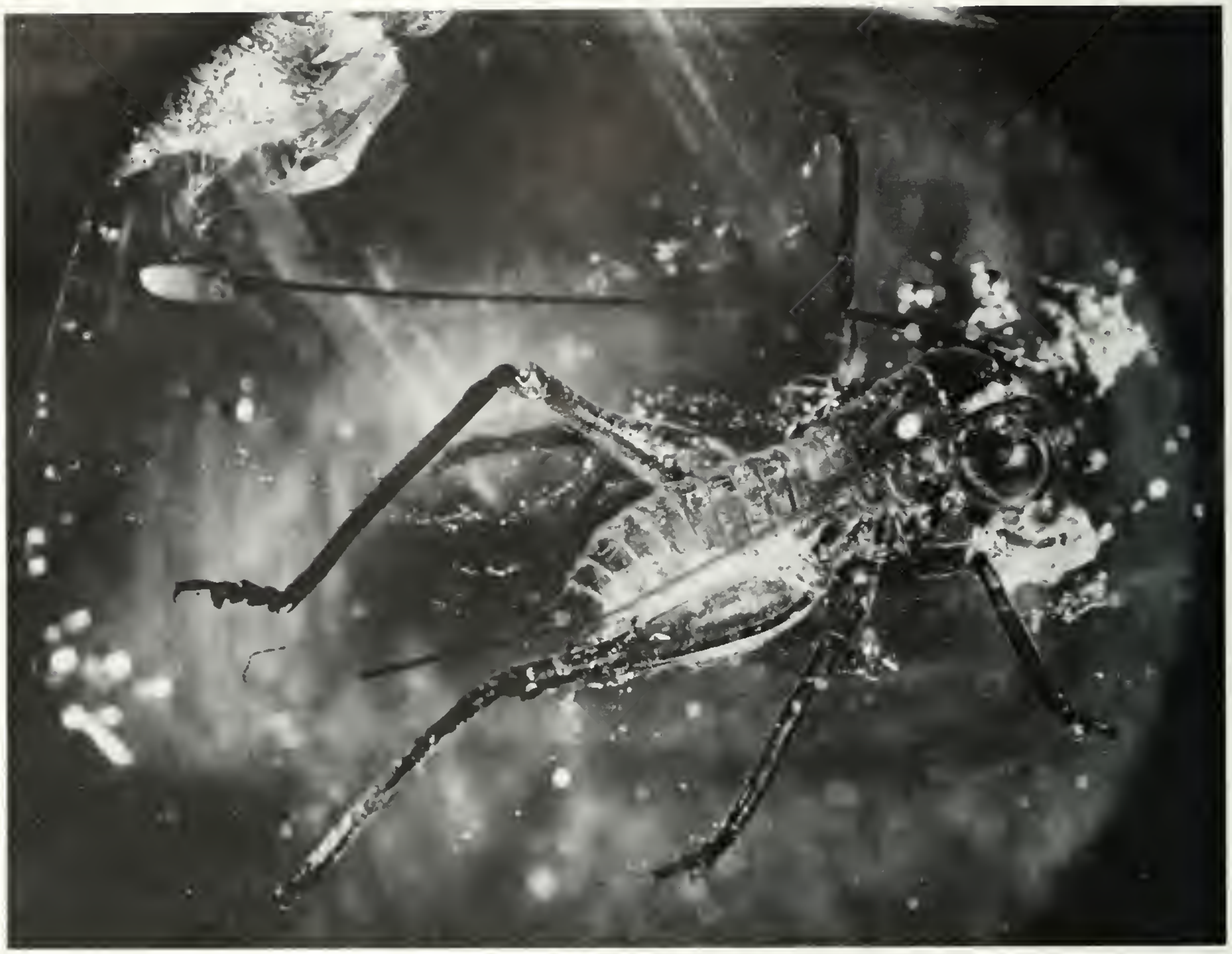
Kohlman's microscope. For a small amount of money he was able to buy the entire collection.

In 1953 Trinklein offered the amber for sale to the Field Museum, which promptly purchased it. Trinklein used the cash to buy science equipment for his high school and the Museum was able to provide permanent safekeeping for a fossil collection of great value.

Of immediate, primary interest to Field Museum scientists was the question of the amber's geographic origin and its age. It is known that amber deposits occur throughout the world and that they date from a variety of geologic periods. The oldest true amber occurs in Denmark in strata of Jurassic age (at least 135 million years old). Cretaceous ambers (135 million-63 million years old) are found in North America, Siberia, and Europe. Physical and chemical tests made on the Kohlman amber indicated that it is from the southern Baltic region (the source of 90 percent of all known amber) and is of Eocene age—about 40 million years old. The likelihood that this is Baltic amber is further supported by the fact that Herrin is known to have been a collector of amber from this region.

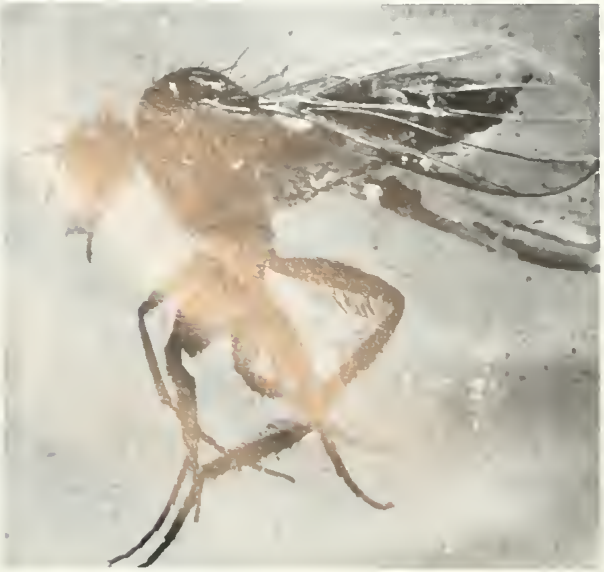
Amber is seldom found at its place of origin. In ages past it was sometimes carried away by streams and rivers—often great distances from its place of origin. It is this displacement and burial under protective layers of earth that has made it possible for amber to survive in its original state for many millions of years. Once amber is removed from its bed of earth, sand, or gravel, it may be exposed to conditions that can alter it in one way or another and eventually destroy the imbedded fossil.

This vulnerability is a real headache for the museum curator, who has been obliged to experiment with all sorts of preservation techniques, such as storing the amber in water; in oil; in dry, cotton-plugged vials; and mounting the fossils on microscope slides. But each of these methods has its drawback. Water, when combined with amber, provides a good medium for bacterial growth; antibacterial agents added to the water to counteract this problem may dissolve the amber. Mineral oil is a popular storage medium for amber because the two substances have a similar refractive index; stored over a long time, however, the oil discolors the amber. Amber stored in plugged vials eventually dries out and cracks. Mounting on microscope slides is probably the best preservation technique, but specimens mounted in this way can be viewed from only two sides. This is a small price, however, for maximum protection.



*Cricket, family Gryllidae*

Although the collection had been carefully assembled by Kohlman, it had been the victim of neglect before being acquired by the Museum. Many slide-mounted specimens had come loose and been separated from the identifying labels originally placed with them. During the past three years I have examined the almost 3,000 pieces of amber with insect inclusions in the Kohlman collection, remounting or highly polishing close to 1,500 specimens. The remainder of the fossils had been cut in order to make them easier to examine for identification, but were not permanently mounted to allow future researchers studying the fossils to make the decision as to what sides should be polished and mounted.



*Fly, family Empidae*

In general content, the Kohlman Amber Collection is much like other collections of Baltic amber: About 65 percent of the inclusions are Diptera, or true flies, with the family Dolichopodidae the best represented (20 percent of the entire collection). Other dominant dipteran families are the Sciaridae, Mycetophilidae, Chironomidae, Tipulidae, and Empidae. In all, 17 families of Diptera have been identified. The Araneida, or spiders, comprising 8 percent of the fossils, are the second largest group in the collection.

The insect order Hymenoptera accounts for 7 percent, the ants being the most common of that group; the Chalcidoidea, a group of parasitic wasps, are also well represented.

An additional fourteen arthropod groups make up the rest of the collection. The insect orders Trichoptera, Coleoptera, and Homoptera, and the Acari (ticks and mites) each comprise from 2 to 4.5 percent. The remaining ten arthropod groups are represented by only a few specimens in each case.

The scientific importance of the Kohlman

Clockwise from top left: *beetle (Mordellidae), fly (Asilidae), ant (Formicidae), fly (Dolichopodidae)*

collection has been underscored by the research so far done on it. It has yielded, for example, previously unknown and extinct species; and we have gained a better understanding of the environment of the forests which produced the resin. Groups of sciarid flies, which are known to swarm in the spring—and presumably did so during Eocene times—are found in the amber, so we can make the assumption that the resin that later transformed into amber also flowed during that season of the year.

Specimens in the collection also give us some insight into their behavior during life: fossils of the Psychidae, or bagworms—a family of moths, show that some of these made their larval cases out of tiny hairlike structures found on certain oak leaves.

The Kohlman Amber Collection of the Field Museum now passes into an important phase: The specimens having been curated and, in most cases, identified down to family, genus, or species, will be studied by specialists in order to gain a clearer picture of the evolution of the insects and spiders that inhabited the forests of Europe 40 million years ago. □

# TOURS FOR MEMBERS

*John White (above) and Eli White will introduce you to Native American life style during Field Museum's exciting* Native American Crafts Retreat, *August 2-7, at Kampsville, Illinois. The Whites will demonstrate how wild foods were foraged, processed, and cooked, using tools (you will make) of stone, clay, bark, and wood. If you have never eaten acorn pancakes or steamed duck potatoes, now's your chance! Per person, including transportation from Chicago: $315.00. For additional information or reservations call the Tours Office: 332-8862 now.*

*Field Museum's 15-day tour to Baja, California leaves Feb. 6, 1982, with space for 30 Members. The group will be quartered aboard the comfortable* M. V. Pacific Northwest Explorer, *built in 1980. Tour leader-lecturer will be Dr. Robert K. Johnson, chairman of the Department of Zoology. Write or call now to be placed on mailing list for final itinerary (322-8862).*

# TOURS FOR MEMBERS

Alan Kolata

*Village festival on shores of Lake Titicaca in Bolivia. Dancers wear costumes bearing images derived from the ancient art of Tiahuanaco, an empire that ruled the southern Andes 1,500 years ago.*

## *Peru and Bolivia*

October 15-November 1

Tour Price: $3,100

*This tour includes the fascinating cities of Lima, Cuzco, Trujillo, Puno, a train trip to fabulous Machu Picchu, four full days in La Paz, and a hydrofoil ride on Lake Titicaca. Dr. Alan L. Kolata, visiting assistant curator of South American archeology and ethnology, will accompany the tour members during the entire trip. Dr. Michael E. Moseley, associate curator of Middle and South American archeology and ethnology, who for the past ten years has directed large-scale projects on the north coast of Peru, will join the group when we visit his area of research. We will also have an opportunity to see and learn about Dr. Kolata's work at Tiahuanaco. For more information call or write Field Museum tours. Direct telephone line: 322-8862.*

Hermann Bowersox

*Machu Picchu*

Riley Jadwin

## *Egypt (with Nile Cruise)*

February 6-23, 1982

Price to be announced

*This is one of Field Museum's perennially popular tours—always fully booked (so make reservations now!). Emphasis on the major historical sites: the Pyramids at Giza, Memphis, Abydos, the Valley of the Kings, Karnak, Aswan, and Abu Simbel. Eleven nights aboard a deluxe Nile River cruiser. Tour lecturers are U.S. Egyptologists. Group limited to 30. Write or call the Tours Office (322-8862) for brochure.*

*Abu Simbel*

# Egypt in 1903: Travel Notes of Henry Isaac Hart

*by* Gerda Frank
*Field Museum Volunteer*

*Photos courtesy Melva Keller*

"Today the United States holds a respected place in Egyptological scholarship. . . . It was not so one hundred years ago, when there was no American to match the scholars of France, Germany and Great Britain. Americans were concerned with their own future in their own land, were engrossed in the struggle between North and South, and had only slight curiosity about Egypt as a land which figured, rather unpleasantly, in the Bible. Authors like Mark Twain . . . and wealthy tourists, who might spend a winter on the Nile, did nothing to dispel the feeling that Egypt was a strange and different land which could do nothing for the American . . . . What were the pyramids and the sphinx to people who still had not learned their own incredible West?" —So wrote John Wilson in 1964 in *Signs and Wonders upon Pharaoh* (University of Chicago Press).

The state of affairs described by Wilson was not much changed at the turn of the century, when Egypt was visited by Henry Isaac Hart, a young American. Hart's impressions of Egypt survive for us in the form of a few letters and fragmentary journals; but Hart had a sharp eye for detail and even within the scope of his brief reports we find a good deal of information about the way of life in Egypt at that time. His observations also pose an interesting contrast with those of Judith Perrin, who wrote in the October 1980 *Bulletin* of her experiences in Egypt ("Travels in an Antique Land") while with a Field Museum tour of that country.

Hart was born to pioneer parents in Wisconsin. His father had come from England and married a Vermont girl. The young couple went west and staked out land in central Wisconsin, built a log cabin, began to farm, and founded a family. Then, for several years, Hart's father was away as a Union soldier in the Civil War. In 1875 Henry was born in the log cabin, the youngest of five children. The children were able to attend school just in the fall and winter, for during the rest of the year their help was needed on the farm.

Henry was the only one of the Hart children to go on to high school, even though it required a 30-mile ride each way from the farm. After he finished high school, his parents financed his education at the University of Wisconsin, in Madison, where he graduated from law school in 1901.

Instead of settling down to a conventional career as a lawyer, Henry yielded to a burning curiosity to see the world. Unable to afford traveling on his own, he contacted the international publishing firm of Underwood & Underwood, which sent photographers to all corners of the globe to take stereoscopic photographs.

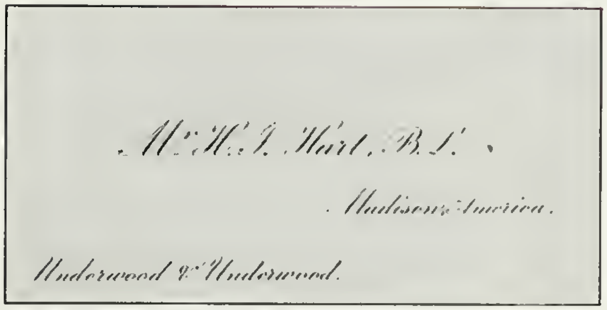
These pictures were organized into collections and sold to schools and other educational institutions as well as to persons who enjoyed "armchair travelling."

Underwood & Underwood hired the young graduate. His challenging first assignment was to travel around the world, taking photographs and selling stereoscopic photo collections and stereoscopes, or viewers. Leaving the United States within months after graduation, Hart spent the first year in England. After some time on the continent, he was to proceed to Egypt, then to India and points east. Hart got only as far as India, where he was accidentally killed, in October, 1903, while hunting with a friend. Hart's body was buried there, but subsequently sent back to the United States and reburied in his home community of Wild Rose, Wisconsin, some 125 miles northwest of Milwaukee.

Hart's Underwood & Underwood assignment is vividly described in a newspaper clipping from Calcutta, where he was interviewed shortly after his arrival there. (The clipping is among Hart's papers; unfortunately the name and date of the paper are missing.):

*We have another American invasion of Calcutta upon us of a very pleasant kind. The invader, Mr. H. I. Hart, is a student from the States, bent on spending a season in that large University without a name, which widens the powers of observation and broadens the culture of its students by sending them through a curriculum of travel in all lands, investing them all the time with grit and self-reliance, and those other manly qualities which make up that outfit of character which is so improving the breed of the outplanted stock of the Anglo-Saxon race as successive generations succeed one another . . . . Mr. Hart pays his way and more as he goes along. And this is the way he does it. He enables you to sit in your room and, at little expense, enjoy a travel through almost any country in the world you have a fancy to see. With a neat aluminum stereoscope and eighty five views, you can have a tour through the Holy Land any evening before going to bed. In the same way you can tour through Italy, or Russia, or go to South Africa, or China, or the Philippines, or to almost any country under the sun and see actual scenes in these countries with your own eyes. The educational value of these scenes is so great that the American Government have provided the Military Academy at West Point and the Library of Congress at Washington each with a complete series.*

*My suggestion is that the managers and Governors of all our educational establishments in Calcutta should provide the Institutions under their care with sets of these views for the use of the scholars. By that means, they would convert the study of history and geography into very pleasurable pursuits and add greatly to the enjoyment of the young people. I hope it goes without saying that His Excellency will give instructions to have the Imperial Library in Calcutta provided with a complete set of these views, along with a number of the stereoscopes, so that the great rank and file of those who frequent the library, and who cannot, by reason of their limitations, go far from their homes, may have an opportunity, on a spare afternoon or evening, of enjoying an imaginative visit to the ends of the earth. Those who can afford to purchase the views for themselves will find them a good investment.*



*Mr. H. I. Hart, B.L.*

*Madison, America.*

*Underwood & Underwood.*

*Henry Isaac Hart, 1902 photo, taken in London. His calling card, likewise (from "Madison, America"), was printed in London.*

After Hart's death, his few belongings were sent home to his family. Some of these personal effects—diaries, letters, pictures, and Hart's stereoscopic camera—have come into the possession of Hart's niece, Mrs. Melva Keller, a Chicago resident.

Hart had left Europe by way of Piraievs, Greece, aboard the steamship *Tzar,* bound for Alexandria. "We have landed in Egypt at last!" he writes. ("Egypt at last!" writes Mrs. Perrin.) Hart had no special knowledge of Egyptian history or art, and travelled only with three young colleagues. There was no preparatory literature available.

He was as well prepared to see Egypt as could be expected of any alert young American in 1903: halfway between the time when Champollion deciphered hieroglyphic writing, and the present.

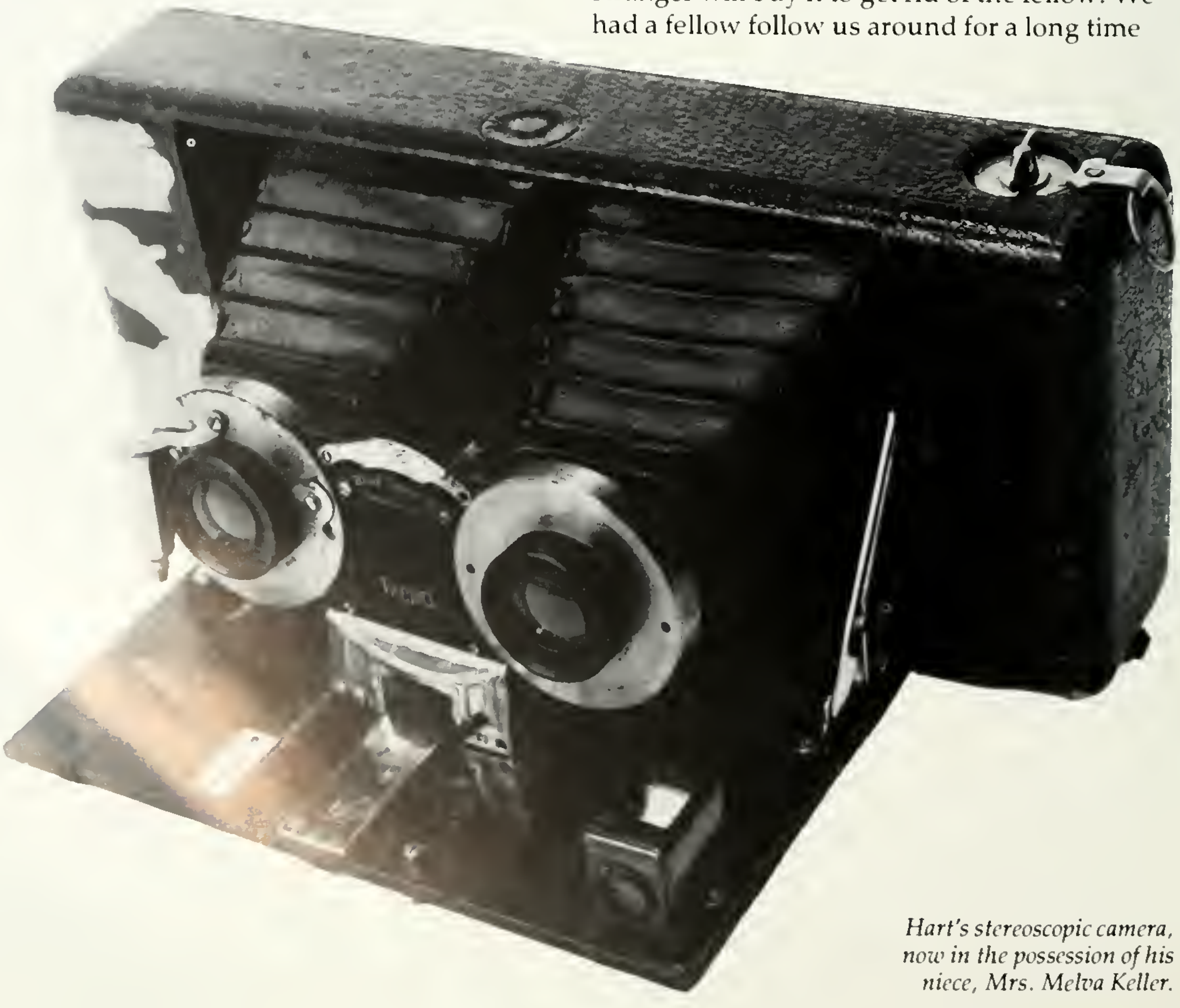
"Egypt, as you are undoubtedly aware," he writes to his pioneer parents with the presumption of youth, "consists only of a narrow strip of land, from 4 to 10 miles wide, stretching along either bank of the Nile for nearly a thousand miles. It is said that the amount of arable land is doubled every year since the English have possession." And, following up with his knowledge of farming, when he reaches Upper Egypt, he notes: "At this place, no one has ever seen a cloud. The sky is perfectly clear every day, and the sun shines every day alike. Notwithstanding this, the fields are covered with luxuriant crops and grasses, which are watered by artificial means as well as being overflowed once a year by the inundation of the Nile."

"Alexandria," he writes "is a flourishing city, but is very commonplace, aside from the interest one cannot help but take in one's first glimpse of orientalism.... Pompey's pillar is worth seeing, situated as it is on the top of a small hill, in a deserted part of the city. The filth is the most noticeable part of the surroundings.... We have been for a walk through some of the streets and watched the darkskinned Arabs with their peculiar costumes. The men wear all kinds of outfits, some wear white robes, looking as though they were out in their nightshirts...."

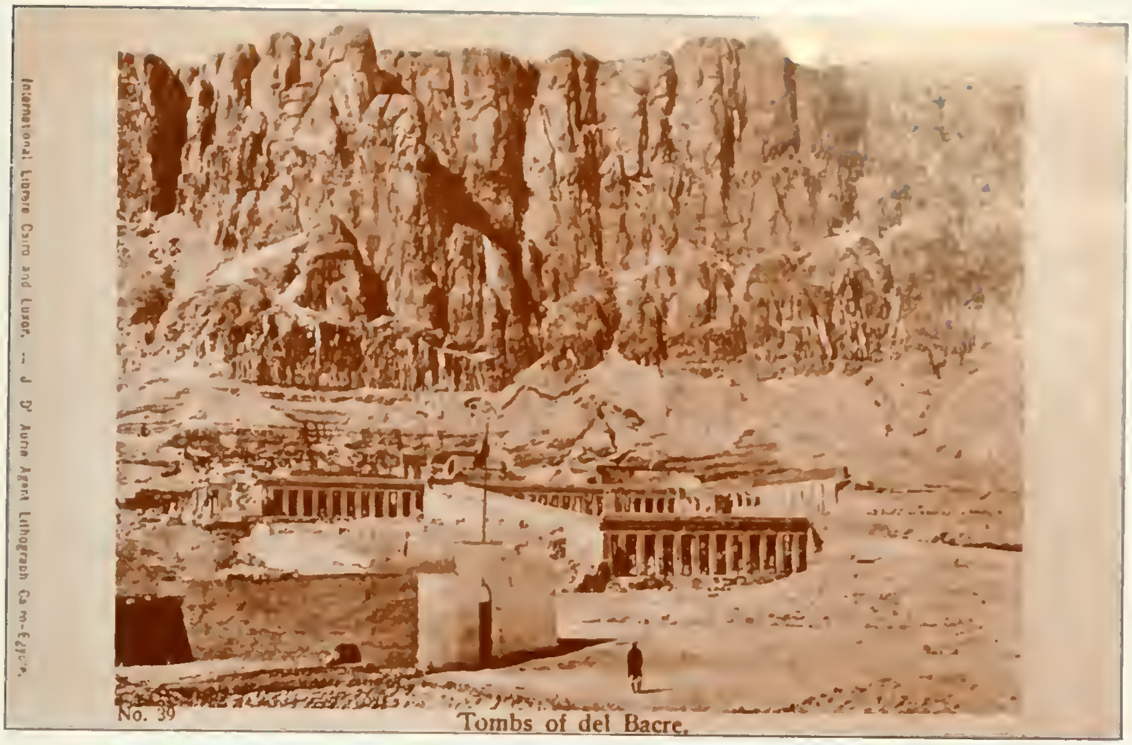
But he is enthusiastic about Cairo. "To spend two weeks in Cairo during the month of February," he writes in his diary, "is a privilege of a lifetime. There are thousands of things of interest, but the one overshadowing feature of the place is the daily life. To wander through the Bazzars [sic], not to buy but just to look, is an occupation most fascinating, and one of which a person will never grow weary."

There is no reference to the Cairo Museum. The original storehouse for Egyptian antiquities, started by Mariette in 1857, was known as the "Boulak Museum," and on the banks of the Nile; subsequently it was flooded. The present Cairo Museum building was constructed between 1897 and 1902.

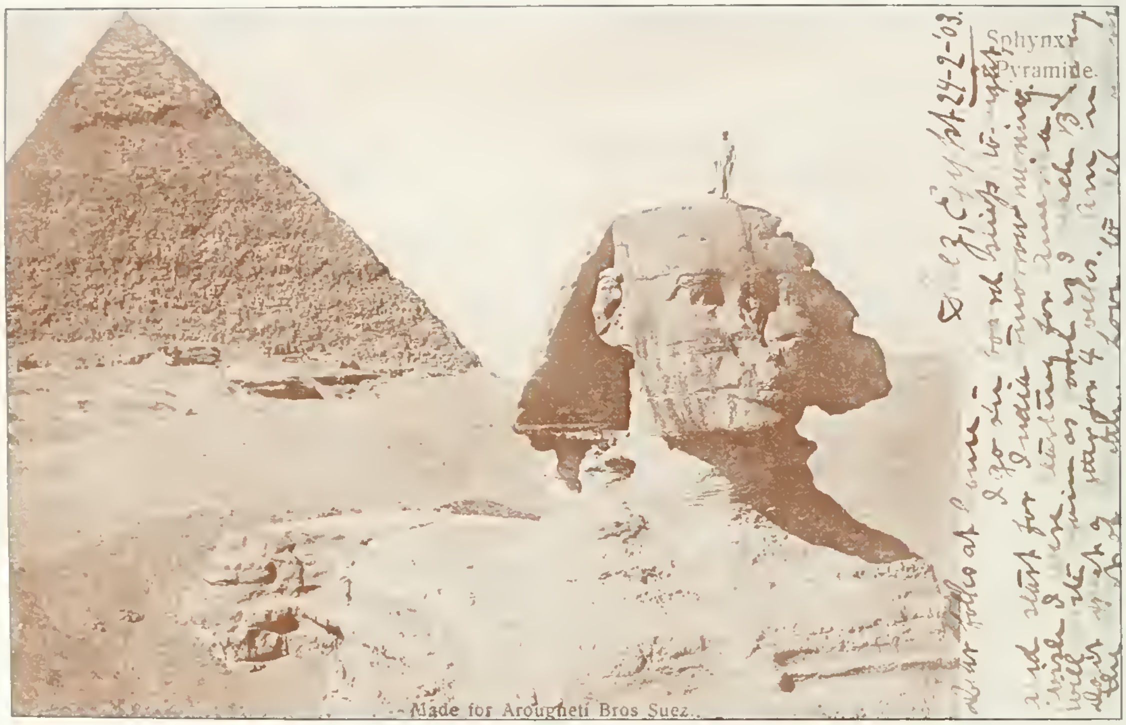
Hart experiences, too, some of the annoyances of the modern traveller who is not protected by a group leader: "All travellers in Egypt are continually beset by young Arabs who want to act as a guide," Hart writes, "and it is almost impossible to get rid of them, unless one threatens them in a savage tone of voice. They look on every foreigner as legitimate prey, and use every means in their power to get his money away from him. They will ask 10 times as much for an article as it is worth, and will follow a stranger around for hours, trying to induce him to buy; always offering it for less and less money, until the stranger will buy it to get rid of the fellow. We had a fellow follow us around for a long time



*Hart's stereoscopic camera, now in the possession of his niece, Mrs. Melva Keller.*


International Lumiere Cairo and Luxor. — J. D' Aune Agent Lithograph Cairo-Egypt.
No. 39
Tombs of del Bacre.

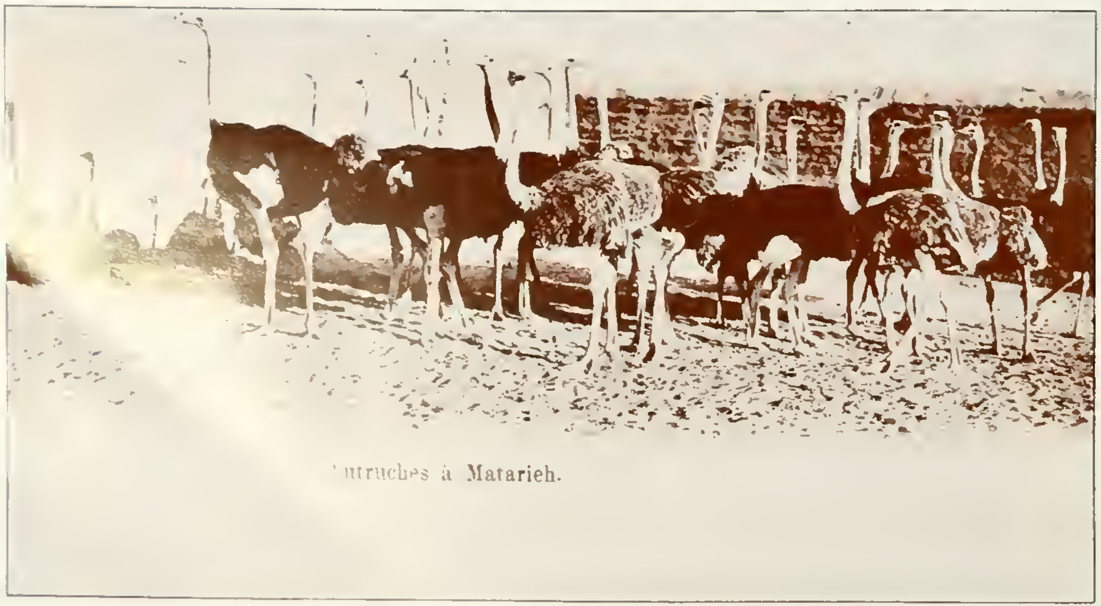
Above: *Funerary temple of Hatshepsut shown on postcard acquired by Hart. Since then the temple has been further exposed.* Below: *published by Underwood & Underwood, a view that may well have been the work of Henry Hart* today, in spite of the fact that we told him repeatedly that his services were not required and that we wanted him to leave us. We got on a streetcar, and he came right on with us, and of course wanted us to pay his fare." But Hart enjoys the teeming life of Cairo: "In the evening," he notes, "up to any hour you like, there is the fishmarket."



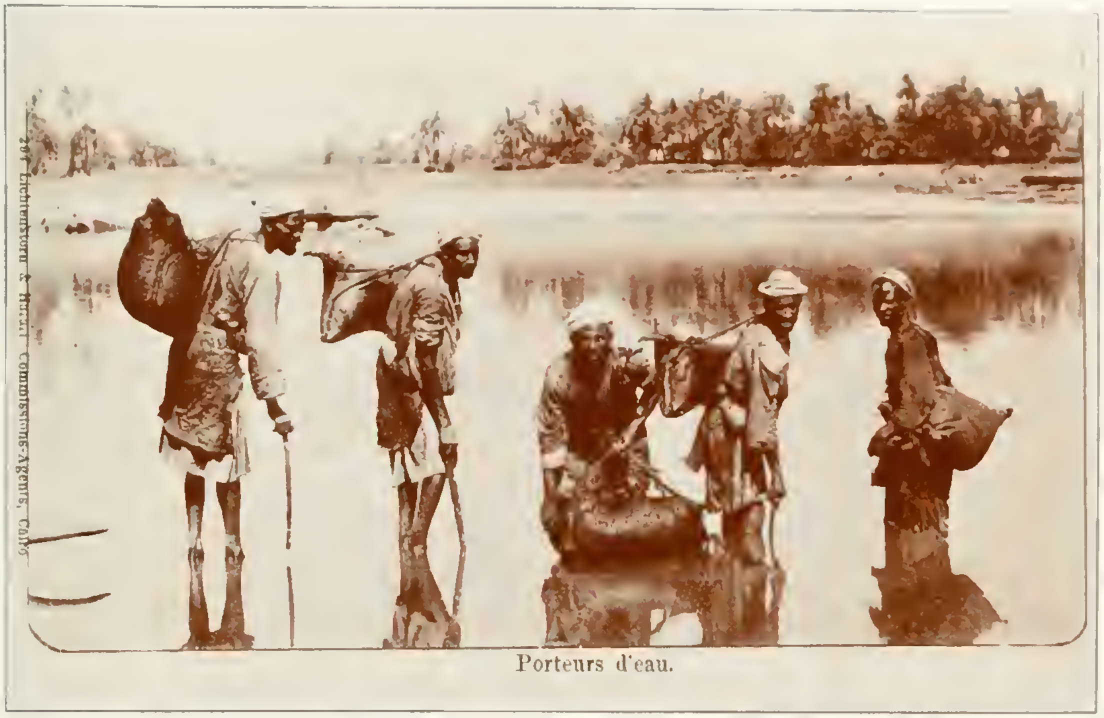
*Postcard sent by Hart from Suez, Egypt, to his family in Wild Rose, Wisconsin, on Feb. 24, 1903: "Dear Folks at Home: I go on board ship to-night and start for India tomorrow morning. Wish I were starting for America. Will write again as soon as I reach Bombay. Don't expect a letter for 4 weeks. Am in the best of health. Love to all, Henry."*

Unfortunately, most of Hart's photographic negatives and prints have been lost and the prints that survive have faded beyond recognition. But Hart also collected picture postcards that show Egyptian scenes of 1903. One of these is of an ostrich farm, near Cairo, which no longer exists. "I will send you a feather which I got out there," writes Hart to his family. The interest in ostrich feathers continued the ancient tradition of hunting wild ostriches, with which we are familiar from the 1977 Tutankhamun exhibit, where we saw the gold relief of the young king hunting ostriches, and one of his ornate ostrich feather fans.

For those who love Hatshepsut's temple, there is a postcard showing what the temple looked like 80 years ago. The two ramps we see today are missing, and there is instead a massive wall connecting the tops of the lower two levels. Was this a structure erected by the earliest exca-



*Ostrich farm near Cairo (from postcard)*



*Water carriers fill bags with water from the Nile (from postcard).*

vators? The top level of the temple was still buried by sand and debris. Today, two long ramps, leading to the first and second level, have been reconstructed and are being finished with fragments of the original structure, that had not yet been found in 1903. A Polish-Egyptian team is still occupied with excavation and reconstruction on the third, top level.

Hart undertakes the climb of the Great Pyramid with his friends. "We are four of us going out to the Pyramids tonight," he writes on February 14, 1903, "to see them by moonlight. There is almost a full moon here now, and we are going to watch it rise from the top of the Great Pyramid. These [sic] are about 8 miles from here, and we are coming back about 11 o'clock, on donkeys. Donkeys are used here in place of cabs, and afford a convenient, but inelegant way of getting around." After the excursion, Hart describes the experience: "We have been out to the Pyramids and climbed to the top of the highest one. This is nearly 500 feet high and is built of solid blocks of stone about 8 feet long and 4 feet wide and 4 feet thick. How these huge blocks were ever raised to such a height is a mystery." (Today we know it was done with ramps.) "These pyramids are said to be over 5000 years old. . . . When one ascends the Great Pyramid, one is assisted by three Bedouin Arabs, one ahold of each hand, and one following behind to give an occasional boost at a difficult stone. There is also a fourth, a boy who carries water and to whom one must give "baksheesh," whether one drinks or not." He also buys a postcard showing water carriers, filling their large leather bags in the Nile. One wonders how this water agreed with the consumers! "On the way up our assistants will encourage him to work hard and beat the others, as 'everybody seems going up the pyramids.' If one gets ahead of the others, he is flattered by such remarks as 'Master is very strong,' etc. etc. As the top is neared, they begin to tell how much baksheesh others have given them, and Master must give more for they have worked extra hard and made Master beat all the others.'"

Hart continues that he gave a fellow some extra money "to run from the top of the Great Pyramid to the top of the second in 10 minutes. After he had accomplished this feat and had come down from the top of the second Pyramid, he had procured a small piece of stone for each of us . . . ," which, if actually from the top, explains why the pyramids have been getting shorter, and certainly proves that souvenir hunting was popular! Hart concludes: "This was the same fellow that climbed this pyramid with

Mark Twain." (See: *Innocents Abroad,* Vol. II, Chapter XXXI.) Today, climbing the pyramids is prohibited.

Mark Twain describes his own climb up the Great Pyramid when he was 32 years old, obviously in bad physical shape and in ill humor. He writes with a good deal less enthusiasm than Hart: "Why try to call up the tradition of vanished Egyptian grandeur; why try to fancy Egypt following dead Ramses to his tomb in the Pyramids." Then follows the account of the Arab sprinting to the top of the second Pyramid and back. Mark Twain did not travel any further south, but Hart somehow makes his way to Luxor. "I have been on a trip up the Nile River," he writes, "and have seen some of the seven wonders of the world. The old temples around Luxor are unsurpassable in size and grandeur. . . . The temple at Karnak is so vast that one is bewildered when attempting to comprehend it."

Hart's description of the Valley of the Kings is brief: "The trip on donkeys to the tombs of the Kings is interesting, but fatiguing." There probably was not much he found worthwhile to photograph in all the desolation. Theodor Davis began his successful excavations there only in 1903, and the tomb of Tutankhamun was not to be discovered until 20 years later.

Ascension de la grande Pyramide.
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*Tourists climbing a pyramid the easy way (from postcard).*

After Hart's return to Cairo, he made a last excursion to Sakhara, where "we saw the tombs of the sacred bulls, which is an enormous dug-out, and is most suffocating when inside. . . . Went from Sakhara to Gizeh across the desert on donkeys, 9 miles. At sundown my donkey boy stopped to pray and I never saw him again." Hart's last diary entry from Egypt describes that he arrived back "just in time to see the procession of the Holy Carpet, as it started for Mecca. Also saw Khedive and Sir Wingate."

From Egypt, Hart travelled directly to India, where six months later he met his death at the age of 28. □

# July, August & September at Field Museum

*July 16 to September 15*

### New Exhibits

"Hopi Kachina: Spirit of Life" and "The Year of The Hopi." For the first time in its history of offering traveling exhibits to the public, Field Museum has two special exhibits running simultaneously, both on the Hopi Indian. "Hopi Kachina: Spirit of Life" features Hopi art and artifacts, including two of the oldest and finest examples of Native American mural art. The exhibit also includes two large-scale models of Hopi religious ceremonies. "The Year of the Hopi" presents haunting photographs and delicate watercolors by Joseph Mora, dating back to the first decade of this century, before cameras were banned from Hopi public dances. Exhibits curator: James VanStone; designer: Clifford Abrams. Through September 8. Halls 26 and 27, second floor.

### Continuing Exhibits

Hall of Indians of the Southwestern United States. This permanent exhibit is an excellent supplement to the Museum's special exhibits on the Hopi. In addition to displays on Hopi rituals, the hall contains an exhibit of kachina dolls from Field Museum's own collections. This hall also includes archeological materials showing the development of cultures in the Southwest, beginning with the Cochise culture, *ca* 5000 B.C. Hall 7, main floor.

### New Programs

Asia Festival. Bring the whole family for a day-long festival celebrating the beauty and diversity of the cultures of Asia. Through films, slide programs, tours, craft demonstrations, and performances, you'll get a fascinating look at the land and peoples of China, Japan, India, and Southeast Asia. Watch the story-dramas of India unfold through Bharata-Natyam temple dances performed by the Netyakalalayam School. Witness an exciting demonstration of Kalarippayett, a South Indian martial art from Kerala. Other special performances feature traditional Cambodian music, Chinese ballet gymnastics, Japanese and Thai classical dance, and "The Brides of India," a show of traditional bridal dress. The day's activities include demonstrations of calligraphy, Indian breadmaking, batik and weaving, origami, shiatsu, sumi-e, children's games from China, acupuncture, the art of bonsai, and more. Sunday, July 19, 11 a.m.-5 p.m.

Lill Street Gallery Pottery Demonstration. Eric Jensen, an artist from the Lill Street Studio, uses traditional hand-building techniques to create everyday pottery and sculptures in clay. This free presentation is offered in celebration of CityArts Week organized by the Chicago Council on Fine Arts. Stanley Field Hall. Saturday, July 11, 2 p.m.

Najwa Dance Corps. Enjoy an evening of traditional African tribal dance and fire dancing from the Bahamas. The Najwa Dance Corps presents "African Suite with a Taste of the Islands." This free performance is offered in conjunction with CityArts Week organized by the Chicago Council on Fine Arts. James Simpson Theatre. Friday, July 17, 8 p.m.

Highlight Tours. The Education Department offers special weekday tours focusing on the Museum's most popular exhibits. You can learn about the religious practices of ancient Egypt and the significance of American Indian rituals, or observe animal life at an African waterhole. These one-hour guided tours meet at the North Information Booth, Stanley Field Hall, at 1 p.m. Monday through Thursday. No tours on Friday.

*(Continued on back cover)*

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# July, August & September at Field Museum

*(Continued from inside cover)*

SUMMER JOURNEY. The self-guided tour, "The Many Faces of the Southwest," takes you on a journey to a land of arid deserts, deep canyons, and cool mountain forests. Learn how the native plants, animals, and people have adapted and continue to thrive in these extreme environments. Free journey pamphlets are available at Museum entrances.

WEEKEND DISCOVERY PROGRAMS. Participate in a variety of free tours, demonstrations, and films every Saturday and Sunday between 11 a.m. and 3 p.m. Check the Weekend Sheet at Museum entrances for locations and additional programs.

Saturday, July 18: "A Desert Place" film feature, 1 p.m.

Saturday, July 18: "Malvina Hoffman" film and tour, 2 p.m.

Saturday, July 25: "The Wandering Dunes" film feature, 1 p.m.

Saturday, July 25: "New-World Origins of Everyday Foods" tour, 2 p.m.

Sunday, July 26: "Chinese Ceramic Traditions" tour, 1:30 p.m.

Saturday, August 1: "Tibetan Culture [illegible]

Sunday, August 2: "Egypt after Alexa[illegible]" tour, 1:30 p.m.

Saturday, August 8: "Native American Foods" tour, 11:30 a.m.

Saturday, August 15: "Make Your Own Kachina Doll" craft project, 1-3 p.m.

Saturday, August 22: "Color a Kachina" story-telling and craft project, 2 p.m.

Saturday, August 29: "The Year of the Hopi: A Tour for Children," 3:30 p.m.

Saturday, Sept. 5: "American Indian Dress" tour, 11:30 a.m.

Saturday, Sept. 12: "Preparation for After-Life in Egypt" tour, 12:30 p.m.

Sunday, Sept. 13: "China through the Ages" tour and slide presentation, 1:30 p.m.

Sunday, Sept. 13: "Life in Ancient Egypt" tour, 2:00 p.m.

## Continuing Programs

VOLUNTEER OPPORTUNITIES. Individuals with scientific interests and backgrounds are needed to work in various Museum departments. Contact the Volunteer Coordinator, 922-9410, ext. 360.

JULY, AUGUST, AND SEPTEMBER HOURS. Through July and August, the Museum is open from 9 a.m.-6 p.m., Saturday-Thursday; beginning in September, until 5 p.m. The Museum is open 9 a.m.-9 p.m. Fridays throughout the year.

THE MUSEUM LIBRARY is open weekdays 9 a.m.-4 p.m. Obtain a pass at the reception desk, main floor. Closed September 7, Labor Day.

MUSEUM TELEPHONE: (312) 922-9410

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# FIELD MUSEUM OF NATURAL HISTORY BULLETIN

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**Field Museum**
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**Bulletin**

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COVER

*Painting of ruby-throated hummingbirds by John James Audubon (1785-1851). It was executed between 1827 and 1830 and first published in his* The Birds of America. *The reproduction on the cover is from Field Museum's rare four-volume set of this work, issued in London between 1827 and 1838, and on permanent view in the North Lounge, second floor. The set was given to the Museum in 1970 by Mrs. Clive Runnells. For more on hummingbirds, see "Hummingbirds," by Alex Hiam, page 12 .*

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# Lungfishes— Alive and Extinct

BY K.S.W. CAMPBELL

There are only three living lungfish genera, one on each of the southern continents excepting Antarctica. All are restricted to life in freshwater environments. Some live for long periods in pools where predators are few and the environment is uniform, but others live in periodically drying streams where they can survive buried in the mud. The Australian species, *Neoceratodus forsteri*, has been known to live in aquaria for at least 48 years, the length of time that Chicago's Shedd Aquarium has had two specimens, a male and a female.

As a group, lungfish have the characteristics of slowly evolving organisms, and indeed, the recent discovery of tooth plates indistinguishable from those of *N. forsteri* in the Cretaceous (140,000,000-65,000,000 years ago) of Australia has provoked A. Kemp and R. Molnar of the University of Queensland to suggest that this is the longest surviving vertebrate.

But lungfishes were not always like that. On the contrary, early in their history they evolved at rates that are considered to be excep-

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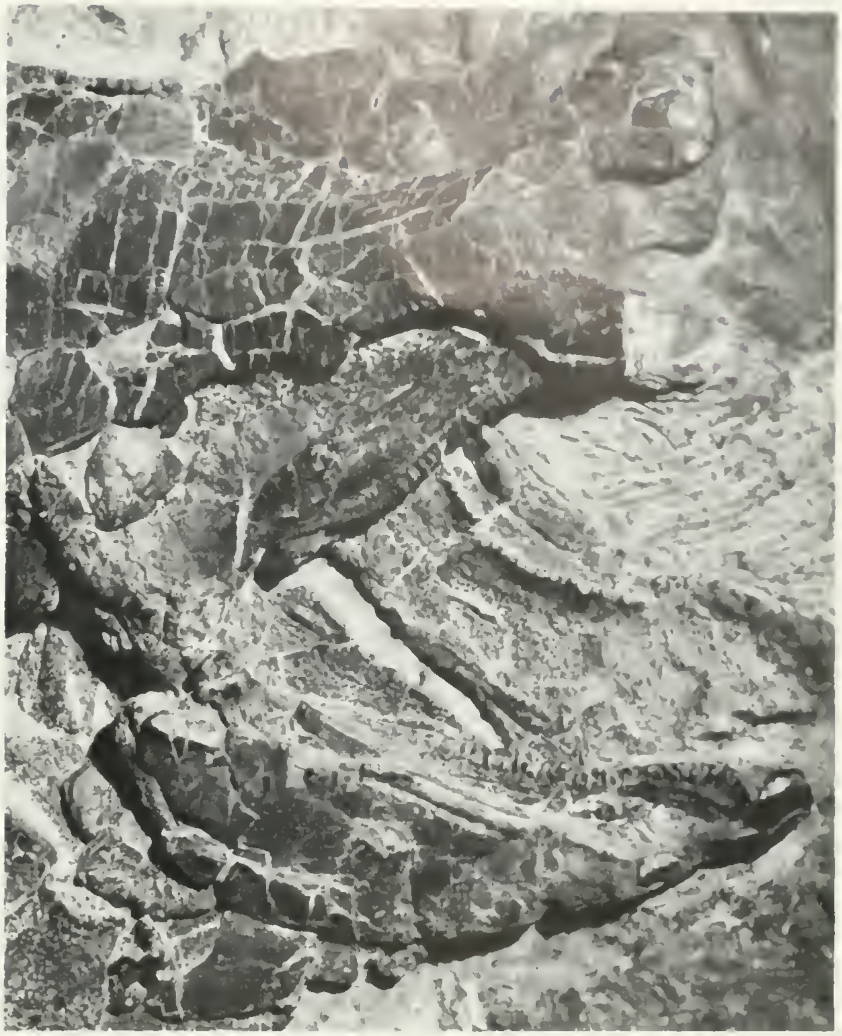
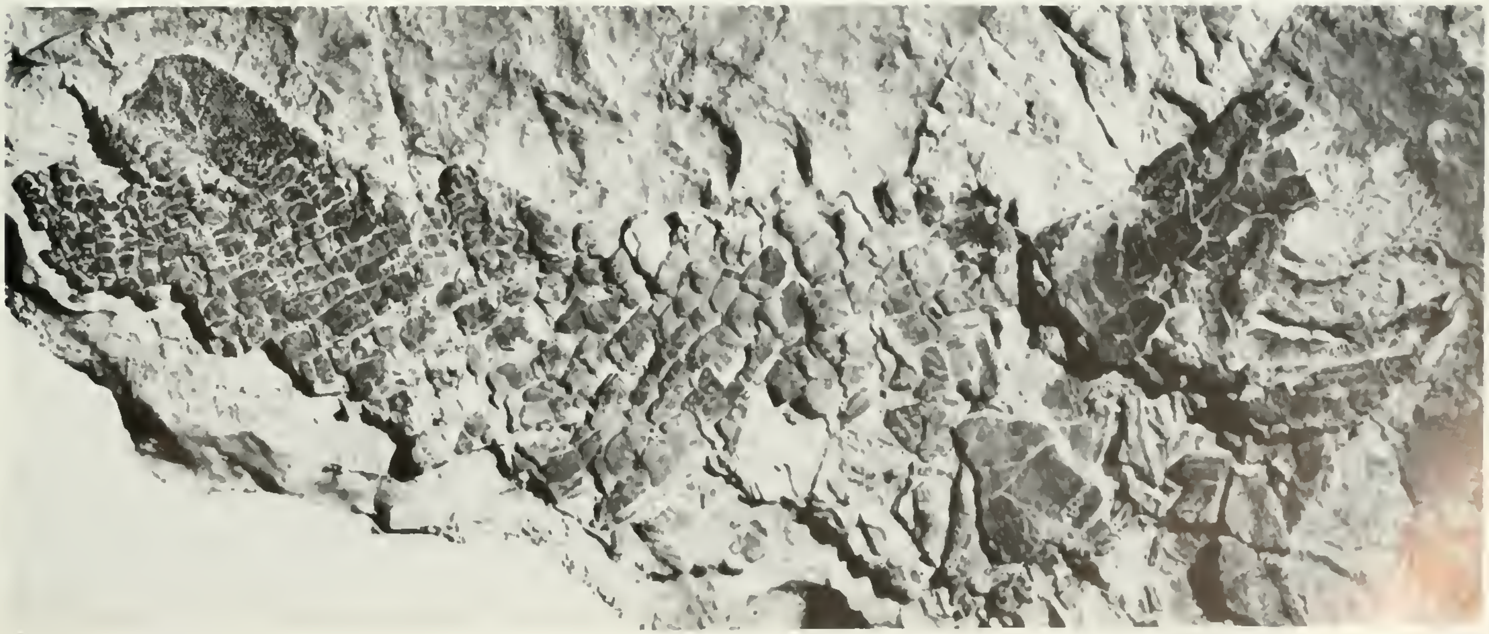
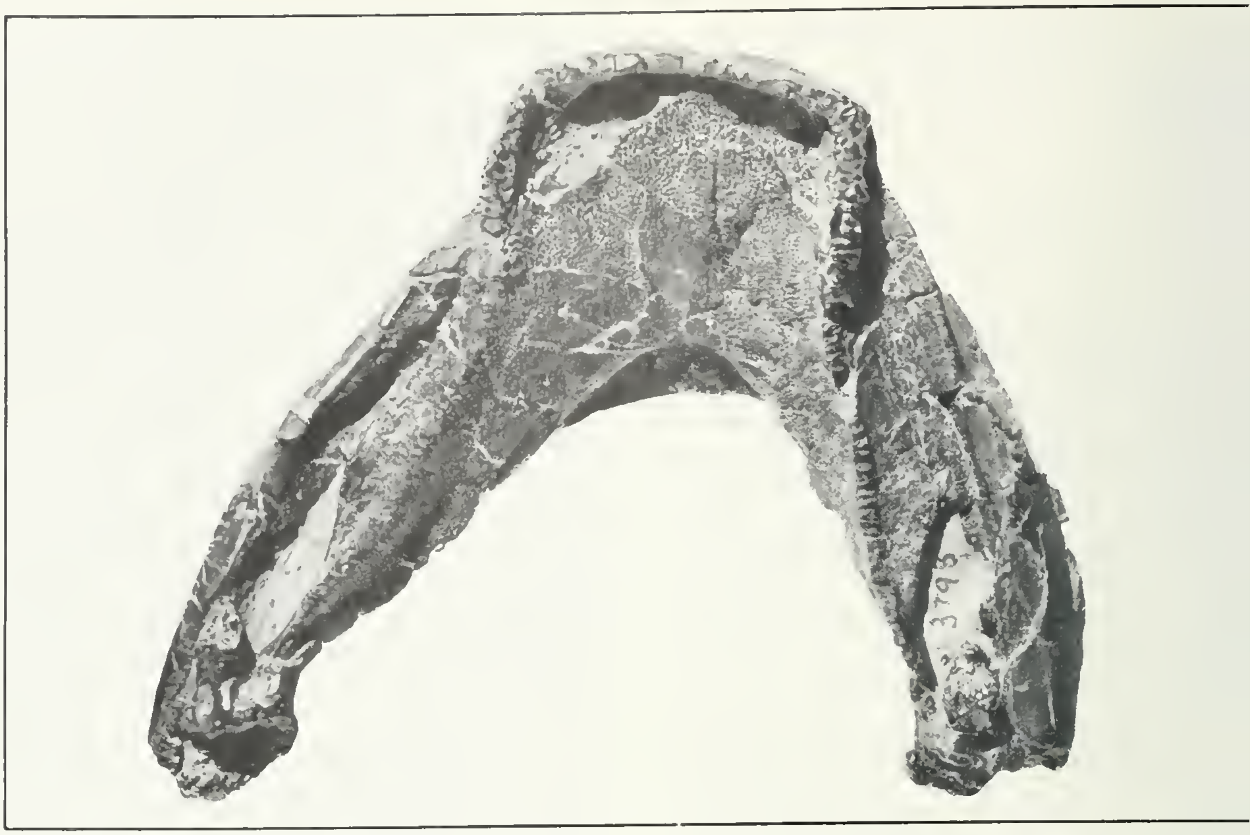
*K.S.W. Campbell, currently at Field Museum under the Visiting Scientist Program, is a reader in geology at the Australian National University (Canberra), where he was formerly head of the Department of Geology and dean of the Science Faculty.*



*Detail of head of fossil lungfish* (Uranolophus wyomingensis) *in the Field Museum collection. Entire specimen is shown below.*

*Fossil lungfish specimen* (Uranolophus wyomingensis) *of the early Devonian period found in Wyoming shale, in the Field Museum collection.*



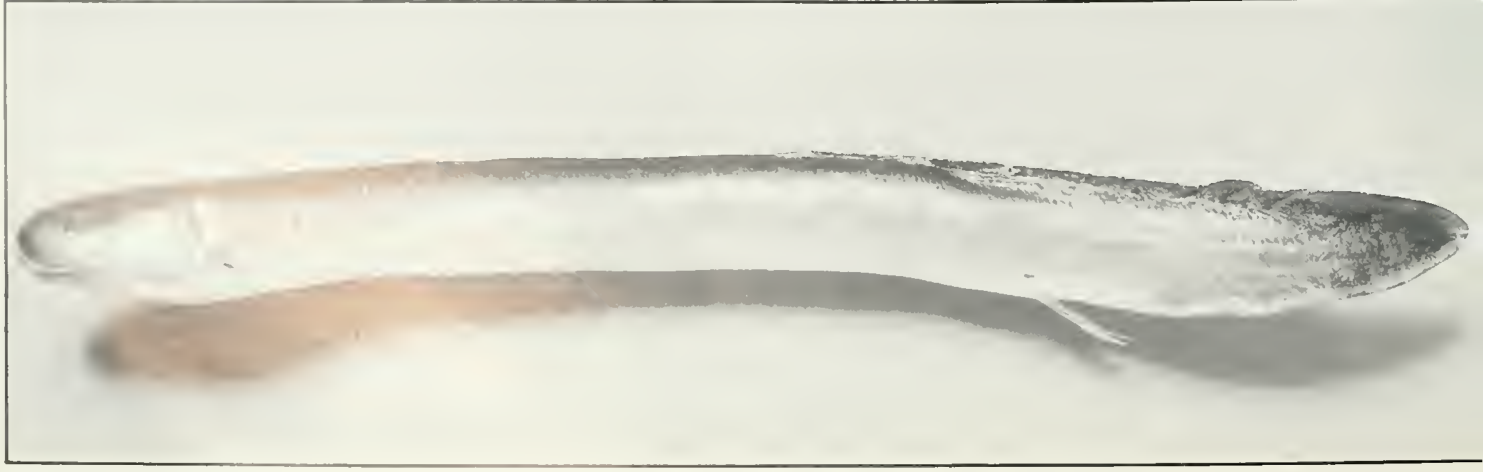


*Lower jaw of extinct North American lungfish* (Uranolophus wyomingensis).

tionally high. Work by T. S. Westoll of Newcastle University, England, as long ago as 1948, indicated that evolutionary rates increased exponentially back to the Devonian, about 400,000,000 years ago. Discoveries in the 1960s and 1970s have emphasized the correctness of Westoll's views, but in addition have provided us with a mass of new morphological data. These discoveries were of two skulls and jaws of the genus *Dipnorhynchus* in limestones of Early Devonian age on the Murrumbidgee River near Canberra. These specimens, etched from the limestone using acetic acid, revealed intricate details of the nerve and blood systems, previously quite unknown in vertebrates so old. Then, in Wyoming, numerous specimens of the genus *Uranolophus* were found in slightly older siltstones and shales. Though these specimens are badly crushed, they have the advantage of possessing not only skulls and jaws, but also much of the post-cranial material as well. Finally, in the Gogc region of N. W. Australia, the most magnificently preserved Devonian vertebrates ever found wer recovered in great numbers from limestone nodules. These specimens also can be etched from the matrix, and are so unaltered that when completely prepared for study they have the ap pearance of clean, white, recent bone. Among tl wealth of species recovered from this formation are four lungfishes, and from two of these we now have more information than from any lungfish other than the three living ones.

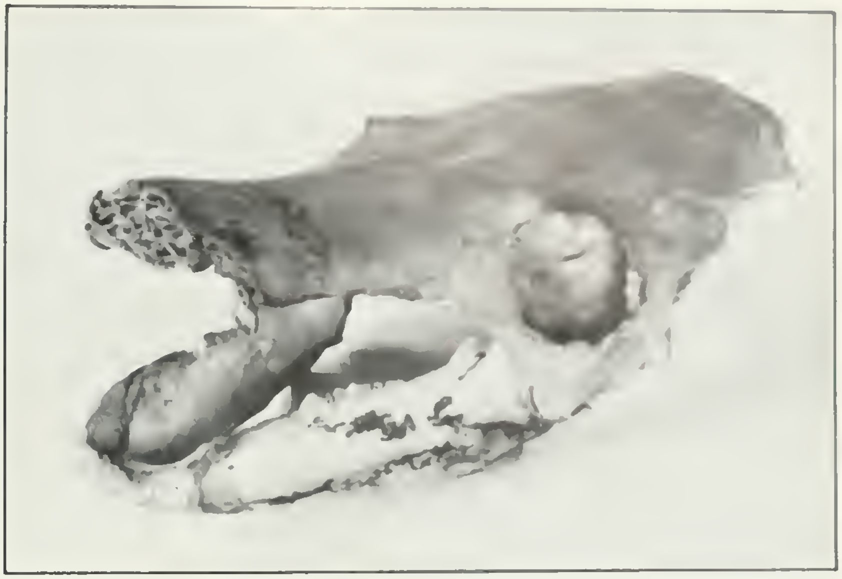
So what can we learn from all this? In the first place, both Australian occurrences were undoubtedly in marine rocks, and the preservation indicates that the animals were living where they were entombed. They did not exist elsewhere only to be transported into the sea prior to

*Preserved specimen of South American lungfish* (Lepidosiren paradoxa) *in the Field Museum collection.*



burial. The environment of the Wyoming occurrence is not unequivocal, but it has been determined as marginal marine. This information provides a caution to those inclined to postulate the characteristics of organisms of the past on the basis of generally distributed characters in living representatives. Modern lungfishes lack the physiological capacity to cope with sea water; hence, this has been assumed to be a feature of their common ancestor. It now appears that the remote ancestors had one of the currently known methods or some as yet unknown method of maintaining a salt balance in their bodies.

Secondly, although the oldest lungfish species known have in common many features that are not shared with younger species, they nevertheless belong to two evolutionary lines which continue through the Carboniferous and Permian (340,000,000-230,000,000 years ago). These lines are characterized by the peculiar ways in which the animals chewed. Lungfishes do not have marginal bones around their mouths; hence, they do not have tooth rows like other fishes or later vertebrates. Instead, they develop dentine-covered ridges and denticles on the palate and the inner bones of the lower jaw. In one evolving line, ridges on the palate and jaw complement each other and food is crushed and pulverized between them, the jaw action being dependent on powerful adductor muscles. In the other line no crushing ridges are developed. Rather, there are ridges around the edge of the palate and jaws, but these do not even meet when the mouth is clamped shut. Instead of having a crushing function, these ridges hold the food in the mouth while it is rasped by a series of denticles that line the mouth and cover a very strong mobile rod formed from the basal part of the gill arches. This rod moves back and forth in the mouth as the gills open and close. The jaw muscles are weak, but the gill muscles are very strong. Thus, it becomes a problem to define the characters of the ancestral group that gave rise to both these types.

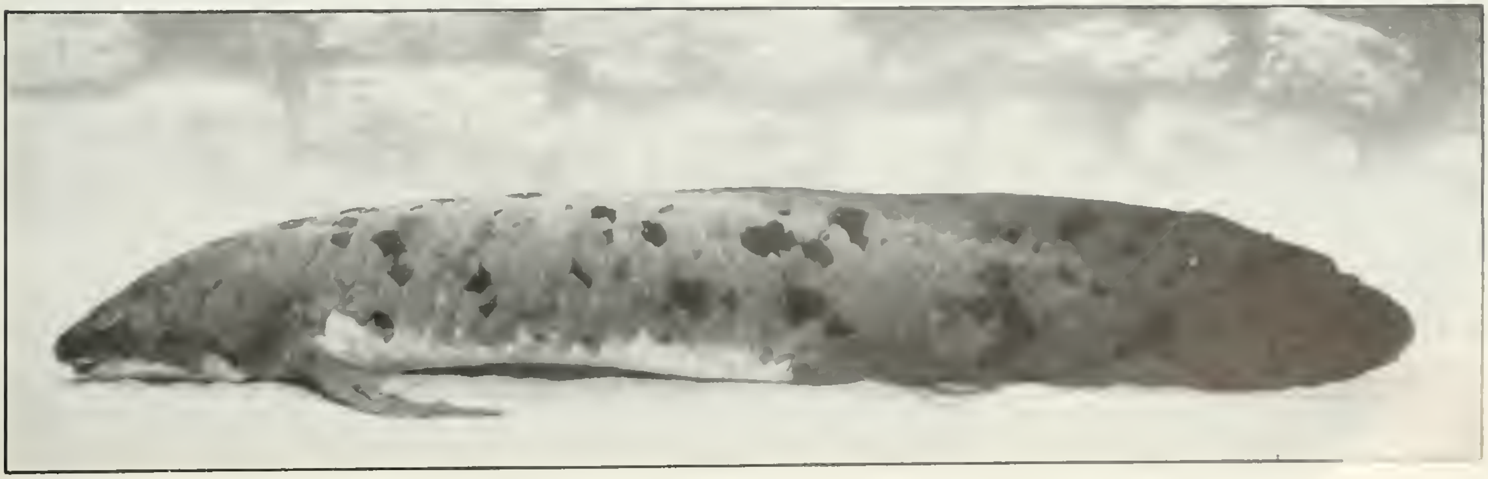


*Skull of Australian lungfish* (Griphognathus) *from late Devonian limestone The specimen was etched from the limestone matrix with acetic acid About natural size*

Finally, the old view that the lungfishes are the closest fishy relatives of the land-dwelling vertebrates, or tetrapods, has reared its head again. After four decades of general acceptance of the view that an extinct group of lobe-finned fishes, the rhipidistians, gave rise to the early amphibians, an influential group of British and American paleontologists, using a large number of new and reinterpreted old criteria, has resurrected the hypothesis espoused by comparative anatomists as far back as the 1830s. In these circumstances the establishment of the characteristics of the earliest lungfishes becomes of prime importance.

During my current stay at Field Museum under the Visiting Scientist Program, I hope to contribute to the discussion of the evolutionary problems outlined above. I will be describing primitive material discovered in the last couple of years in the Australian Devonian, and attempting to establish previously undescribed features of the primitive American species *Uranolophus wyomingensis*. This species was first described in 1968 by Robert Denison, a former curator of fossil fishes at the Field Museum, which has the only collection of this material in the world. ☐

*Australian lungfish* (Neoceratodus forsteri). *This male specimen, about 40 inches in length, has been on exhibit at Chicago's John G Shedd Aquarium since 1933 Photo courtesy Shedd Aquarium Society.*



# FIELD BRIEFS

*Willard L. Boyd*

### Boyd Installed as President

Field Museum's new president, Willard L. Boyd, assumed his duties as the Museum's chief executive officers on September 1, succeeding E. Leland Webber.

Boyd's appointment, announced earlier this year, concluded a year-long search for a successor to Webber, who had announced in 1980 his wish to retire from the post, which he had held since 1962. Boyd, a native of Minnesota, has served as president of the University of Iowa since 1969. Webber, who retires after more than 31 years' service to Field Museum, will continue to be associated with the Museum in a nonmanagement capacity, working on special projects.

### Department of Education

Nina M. Haake, of Evanston, has been named geology instructor. She is a recent graduate of DePauw University, Greencastle, IN, where she earned her B.A. in earth science. Jack MacRae, formerly of Barrington, IL, is the Education Department's new resource coordinator for Harris Extension, which provides loans of portable wildlife and other natural history exhibits to Chicago-area schools. MacRae holds a B.S. in biological science from Southern Illinois University. He succeeds Ray Bernard, who resigned the post.

### Research Grants

Ongoing research projects in the departments of Botany, Geology, and Anthropology have recently been given continued support through grants awarded by the National Science Foundation (NSF) and the Federick Henry Prince Testamentary Trust.

"Flora of Costa Rica," a continuing project under the direction of William C. Burger, chairman of the Department of Botany, has received an NSF grant of $28,074. "Phylogenetic Relationships of the Marsupialia," a project directed by Larry G. Marshall, assistant curator of fossil mammals, has been awarded an NSF grant of $27,300. The continuing project on prehistoric and contemporary irrigation systems in Peru's Moche River Valley, directed by Michael E. Moseley, associate curator of Middle and South American archeology and ethnology, has been granted support by the Prince Trust for the fourth consecutive year; this year's award is for $15,000.

### Public Relations Counsel Honored

Mary Cassai, Field Museum public relations counsel, was recently honored by the Publicity Club of Chicago at its annual awards luncheon. Cassai was presented the "Golden Trumpet Award" for her outstanding publicity achievement by an individual in promotion of "The Great Bronze Age of China," the special exhibit on view at Field Museum August 20 through October 29, 1980. This was the first time in the history of the award, which is open to public relations and advertising professionals in the Midwest, that a Museum staff person has been selected.

### Visiting Scientist Program

Since the inception of Field Museum's Visiting Scientist Program in 1979, sixteen geologists and paleontologists from other institutions have utilized the Museum's collections and research facilities in pur-

*Hopi kachina doll on view in Hall 26. The Hopi exhibits are open through September 8.*

Dave Walsten

suit of their particular research interests. Their periods of tenure have varied from two weeks to about six months, depending on individual research requirements. Under provisions of the Museum's Carl G. Kropff Fund, a stipend goes to each of those accepted under this continuing program.

The sixteen have come from colleges, universities, and museums in the United States, Canada, Australia, England (2), Scotland, France, and West Germany, where each holds a regular staff position.

Currently, three scientists are in residence under the program: W.D. Ian Rolfe, deputy director of the Hunterian Museum, University of Glasgow; K.S.W. Campbell, reader in geology (and former head of the Department of Geology and dean of the Science Faculty) at the Australian National University (Canberra); and Glen K. Merrill, associate professor of geology, the College of Charleston, Charleston, S.C.

Rolfe is investigating pod-shrimps of Mazon Creek, Illinois, and of Mecca shale, Indiana; he is also initiating work on Devonian microarthropods of New York state. Campbell is studying the evolution of early lungfishes (see pp. 3-5), and Merrill is investigating black shales.

### The Energy Crisis and Field Museum: A New Five-Acre Roof

The energy crisis that has come to the forefront in recent years has also been of particular concern to those of us at Field Museum. We now know that nonrenewable energy sources can, when in short supply, greatly affect energy costs, as was amply demonstrated during the 1973-74 oil embargo.

Museum operating expenditures have increased drastically as the direct consequence of the varied and extremely close tolerances in heating/cooling/humidity requirements of our collection storage. Energy management and utilization, then, is of critical importance to us, and we are now in the process of implementing, or have already implemented, some extremely cost-effective energy savings projects.

One of these current projects is the installation of an insulated roof, replacing the badly deteriorated built-up roof (layers of asphalt-impregnated roofing felt) installed in the 1940s. The new roof consists of a one-inch-thick layer of polyurethane foam covered by a 30 mil (3/100" thick) silicone membrane. The foam is an excellent insulator and the seamless silicone surface filters out ultraviolet, thus protecting the foam. The roof covers more than five acres (220,000 sq. ft., or 20,439 sq. m.). The project is being completed by means of Museum modernization funds.—*Norman P. Radtke, manager, Physical Plant*

Dave Walsten

***Display in the Hopi Shop**, Hall 27, adjacent to the current exhibit, "The Year of the Hopi." This special exhibit, together with "Hopi Kachina: Spirit of Life," in Hall 26 will be on view until September 8. The Hopi Shop, open for the duration of the two exhibits, features arts and crafts of the Hopi: silver jewelry, ceramics, wicker and yucca basketry, textiles, and kachina dolls. (The life-size Alva reproduction shown in this display is of the Indian Ben Black Elk, sculpted by Joanna Kendall.) An excellent selection of books on Hopi life and culture, as well as on Southwest Indian culture in general, is also available. The main Museum shop, on the first floor, carries additional Southwest Indian items.*

Saunde

***Dale Vermillion**, equipment manager of Field Museum's Security and Visitor Services,
members of the Clarendon Hills, Il, Explorer Post #357, of the Boy Scouts of America. The
Vermillion's recent talk, given at the Clarendon Hills Village Hall, was security meas
Museum. The post is sponsored by the Clarendon Hills Police Department.*

# Planned Giving

## A New Program to Augment Field Museum's Endowment Fund

*by Clifford Buzard, Associate Development Officer*

A new opportunity for Members to help ensure the financial future of Field Museum has been initiated by the Museum's Board of Trustees. It is a long-range program called "Planned Giving," designed to strengthen the inflation-weakened Endowment Fund, through a series of special gifts and bequests.

An increased Endowment Fund, according to Board Chairman William G. Swartchild, Jr., is among Field Museum's greatest financial needs.

"Up to 1950," Swartchild explains, "the Museum's Endowment income supported as much as 80 percent of an annual budget; today, the Endowment income sustains only 20 percent or less of annual budget. This is the result of the decreasing purchasing power of the dollar brought about by continued inflation since the 1960s."

The new program has been designed to appeal to individuals and families who would like to make substantial contributions to the Museum, but prefer to defer their gift to a future date. They may decide to support the Museum through their lifetime with annual donations, then perpetuate their giving through bequests. Or they may permanently support a special interest, such as a collection or area of research, by restricting their bequest accordingly. In recent months, Field Museum has received bequests of $25,000 and $30,000 from two Members who had contributed a steady stream of small donations each year during their lifetime of active membership.

In addition to seeking bequests, the Museum's "Planned Giving" program will offer to Members various forms of life income instruments such as "life income trusts" and a "Pooled Income Fund."

Life income gifts are immediate transfers of property (usually cash or securities) to the Museum through a trust agreement whereby the donor or named beneficiary receives a lifetime income from the trust. The Museum receives the remaining amount of the gift upon the donor's death.

Field Museum has been the beneficiary of such income trusts since the 1920s, although such a vehicle for planned giving did not come into vogue until established as a "Unitrust," or "Charitable Annuity Trust," in the U.S. Tax Reform Act of 1969. In 1923, Mr. Martin A. Ryerson, an attorney and Trustee of

*Marshall Field*

*Edward E. Ayer*

*Martin A. Ryerson*

the Museum, established such a trust with life incomes going to three persons. Upon the death of the last beneficiary in 1970, the Museum received the remaining principal. Mr. Ryerson also set up a similar "Testamentary Trust" giving life income to his wife and a niece; upon their deaths, the remainder came to the Museum. These trusts demonstrated not only his concern for his family, but also his public-spirited imagination and foresight.

Life income trusts today benefit the donor in several ways in addition to providing life income:

☐ If low-yielding growth stocks are used to make the gift, the donor can usually obtain a higher-yield income through the trust.

☐ If these are appreciated stocks, the donor is exempted from any capital gains tax.

☐ Such a gift in trust gives the donor an immediate income tax deduction for a portion of the total amount of the gift.

☐ The trust is deducted from valuation of the donor's estate for estate tax purposes.

One of the more popular forms of life income giving is the *Pooled Income Fund:* an "umbrella" trust agreement covering a number of donors. A person may participate in such a fund at any time; his gift credits him with a certain number of "units" in the fund, which, in turn, proportionally return to him a life income.

The Pooled Income Fund at Field Museum has been approved by both the IRS and the SEC. Like various other forms of trusts, it is available through the Museum for life incomes covering one or more lives.

Gifts received by the Museum from a will or an income trust instrument customarily go into the Museum's General Endowment Fund, unless the donor has restricted the gift, in writing, to some special interest within the institution.

Gifts and bequests can be either *restricted* or *unrestricted*. Unrestricted gifts enable the Museum officers to apply the monies wherever the need is greatest. Some donors prefer, however, to support an area of special interest by means of their gifts.

The original benefactor, Marshall Field I, made the founding of Field Museum possible. In 1893 he made his first gift of one million dollars to establish the Museum at the persuasion of Edward Ayer. Mr. Ayer showed Mr. Field how he would "have the privilege of being the education host of untold millions of people." His vision materialized with the opening of the Museum during the World's Columbian Exposition. Marshall Field accepted the challenge of this vision: he bequeathed funds to begin an Endowment Fund and to construct the present building. Since its opening in 1921, the present Museum building has served more than 80 million visitors.

Many major benefactors over the years have followed the lead of Marshall Field; they have perpetuated their annual giving to the Museum through generous bequests to the Museum's Endowment. Among them were Marshall Field III, a Museum Trustee from 1914 until his death in 1956 and founder of Field Enterprises, Inc., which includes ownership of the *Chicago Sun-Times*; and Chester Dudley Tripp, a longtime friend of and generous contributor to the Museum, who at his death in 1974 left $1 million to establish an Endowment Fund in his name.

Some of the most important and popular programs at Field Museum function today because an interested Member years ago decided to fulfill a

*Marshall Field III*

*Chester Dudley Tripp*

*Norman Waite Harris*

personal desire to serve education and science. Many programs and exhibits were so established, and the list of such donors is long.

The "Edward E. Ayer Film Lecture" series, endowed by one of the Museum's major founders, is an example of such "special interest giving." Established in 1921, these free spring and fall programs remain among the most popular of the Museum's offerings, attracting up to 1,000 persons for each Saturday afternoon performance.

Norman Waite Harris, founder of the Harris Trust and Savings Bank, saw an opportunity for the Museum to "extend" itself into the public schools: his idea was to provide portable exhibits of animal habitats and environments to Chicago schools on a circulating basis, exposing students to wonders they might otherwise never see. He endowed the N. W. Harris Public School Extension of Field Museum in 1911, and today these mini-exhibits continue to circulate every twenty days among 350 Chicago schools during the year. The exhibits are also available as special loans to Chicago and suburban schools.

Because of the inspiration of Anna Louise Raymond, hundreds of thousands of school children who visit the Museum each year receive supplementary instruction, guided tours, lectures, and workshops. In 1925, Mrs. Raymond established this program in memory of her husband, James Nelson Raymond. Since then, the James Nelson and Anna Louise Raymond Foundation has served more than 6 million children.

In recent years, major gifts from Mr. Ray A. Kroc, founder of McDonald's restaurants, and Mrs. Kroc, and from the late Mrs. John L. Kellogg, have made possible the "Man in his Environment" (Hall 18) and the John L. and Helen Kellogg Hall of Chinese Jades (Hall 30) exhibits, respectively. Additional gifts from Mr. and Mrs. Kroc initiated the environmental education program conducted by the Museum's Department of Education; this program includes ecology field trips for adults as well as a variety of in-house learning activities.

The John Searle Herbarium, in the Department of Botany, memorializes the former chairman of G. D. Searle & Co., pharmaceuticals manufacturer, who for many years was a Field Museum Trustee. Throughout his association with Field Museum, Mr. Searle, grandson of the company's founder, made generous major gifts to the Museum. He perpetuated his charitable giving by establishing three trusts with the Chicago Community Trust during his lifetime and through his will. Field Museum, among others, is a beneficiary of those funds.

The "Planned Giving Program" itself is the third of a three-pronged plan begun in 1976 to meet long-term financial needs of the Museum. The total plan, known to Members as "Commitment to Distinction," was activated in 1976 first through an ongoing program that seeks gifts and multiyear pledges to the annual Operating Fund from individuals, corporations, and foundations. Part two of the plan has been to obtain increased funding from all levels of government, as well as sources of earned income. Part three, Planned Giving, is designed to augment the Museum's Endowment Fund. The three parallel programs are continuous.

Members who wish to learn more about the program are invited to write *Planned Giving Program*, Field Museum of Natural History, Roosevelt Road at Lake Shore Drive, Chicago, Illinois 60605, or telephone (312) 922-9410, ext. 858. ☐

*Anna L. Raym*

*Ray A. Kroc*

*John G. Searle*

# OUR ENVIRONMENT

## Habitat Management Key to Kirtland's Warbler Recovery

It has been sixteen months since the Mack Lake Fire in the Huron National Forest in Michigan. As the 13th Kirtland's warbler census approaches, let us look at the effects of that fire on last year's census and the factors responsible for the current status of the species.

On May 5, 1980, a prescribed burn planned for 200 acres of Kirtland's warbler *(Dendroica kirtlandii)* habitat went out of control because of gusting winds, and burned approximately 25,000 acres. One firefighter was killed, and 41 homes were destroyed or damaged. Some 280 acres which had been occupied by about 14 pairs of warblers in 1979 were burned. The fire was contained the next day.

Although this fire received a great deal of notoriety, prescribed burning is a routine habitat management practice. Indeed, prescribed burns have been conducted successfully by the U.S. Forest Service in thousands of cases nationwide. Developed in the 1930s, the forest management technique of prescribed burning is essential to the survival of the Kirtland's warbler.

Michigan Dept. of Natural Resources

*Kirtland's warbler perched in jack pine*

### Specialized Habitat

The Kirtland's warbler does not adapt to a variety of environmental conditions. This bird has never been found nesting anywhere except in northern Lower Michigan. Since the nesting grounds were discovered in 1903, 90 percent of all nests found have been in the drainage of the Au Sable River. Typically, the warbler is found only among young jack pines occurring in dense stands of 80 acres or more, growing on Grayling sand. For thousands of years, this type of habitat was created only through wildfires. Fire serves to clear the land for new growth and also pops open the cones of the jack pine, scattering seeds to renew the habitat.

Now, modern management practices such as prescribed burns and plantings are used to create suitable warbler habitat. (It is not known whether the warblers will continue to use land that is burned once and repeatedly clear-cut and replanted without the continued use of fire.)

The Kirtland's warbler occupies only areas where the jack pines are about 8-20 years old. They set their nests in the Grayling sand which is extremely pervious to water. This prevents flooding during summer showers.

The specialized habitat of the Kirtland's warbler has been reduced by forest fire control and by forest management practices that encourage the conversion of jack pine to red pine or hardwoods.

### Cowbird Parasitism

Another threat to the warbler has been parasitism of nests by the brown-headed cowbird *(Molothrus ater)*. Cowbirds have been in the warbler's breeding range since the late 1800s but have only posed a serious threat to its reproductive efforts in the past 70 years. According to an examination of warbler nests from 1966-71, 69 percent had been parasitized.

Beginning in the spring of 1972, a cowbird removal program was initiated with the cooperation of the Fish and Wildlife Service, Michigan Department of Natural Resources (DNR), Michigan Audubon Society, and the U.S. Forest Service. In 1980, a total of 2,961 cowbirds were trapped. This program of systematic control trapping has been an unqualified success in reducing parasitism and increasing the yield of young warblers, according to the Fish and Wildlife Service-appointed Kirtland's Warbler Recovery Team.

### 1980 Census

According to the results of the 1980 census of the Kirtland's warbler, this fragile species has shown a 15 percent increase over 1979. (The census is the responsibility of the Kirtland's Warbler Recovery Team, which has delegated coordination to the Wildlife Division, DNR.) The census tallied 243 singing males in 1980, (including one male found in Wisconsin and not accompanied by a female), compared to 211 in 1979. Assuming one female is present for the remaining males, the total breeding population would be 242 pairs, or 484 birds. If all of these Kirtland's warblers could be gathered up and placed on a scale, their combined weights would come to only about 15 pounds.

In 1980, the Kirtland's warbler was found in six Michigan counties: Crawford (93), Oscoda (58), Ogemaw (46), Kalkaska (38), Roscommon (4), and Iosco (3). Numbers increased in all counties except Oscoda, the site of the Mack Lake fire

Previously, one warbler was found in Ontario and Quebec in both 1977 and 1978. In Wisconsin, prior to 1980, two males were found in 1978 and one in 1979. None apparently were accompanied by a female. Although the increased population is welcome news, the numbers are still [illegible] below those from 1951 (432) and 196[illegible] the first two years of a decennial [illegible]

The Kirtland's warbler is [illegible]

Cont[illegible]

# Hummingbirds

## The feeding habits of these delightful creatures and their symbiotic relationship with nectar-producing flowers are as remarkable as their flight

*by* Alex Hiam

*A lovely little creature moving on humming winglets through the air, suspended as if by magic in it, flitting from one flower to another.* —John James Audubon

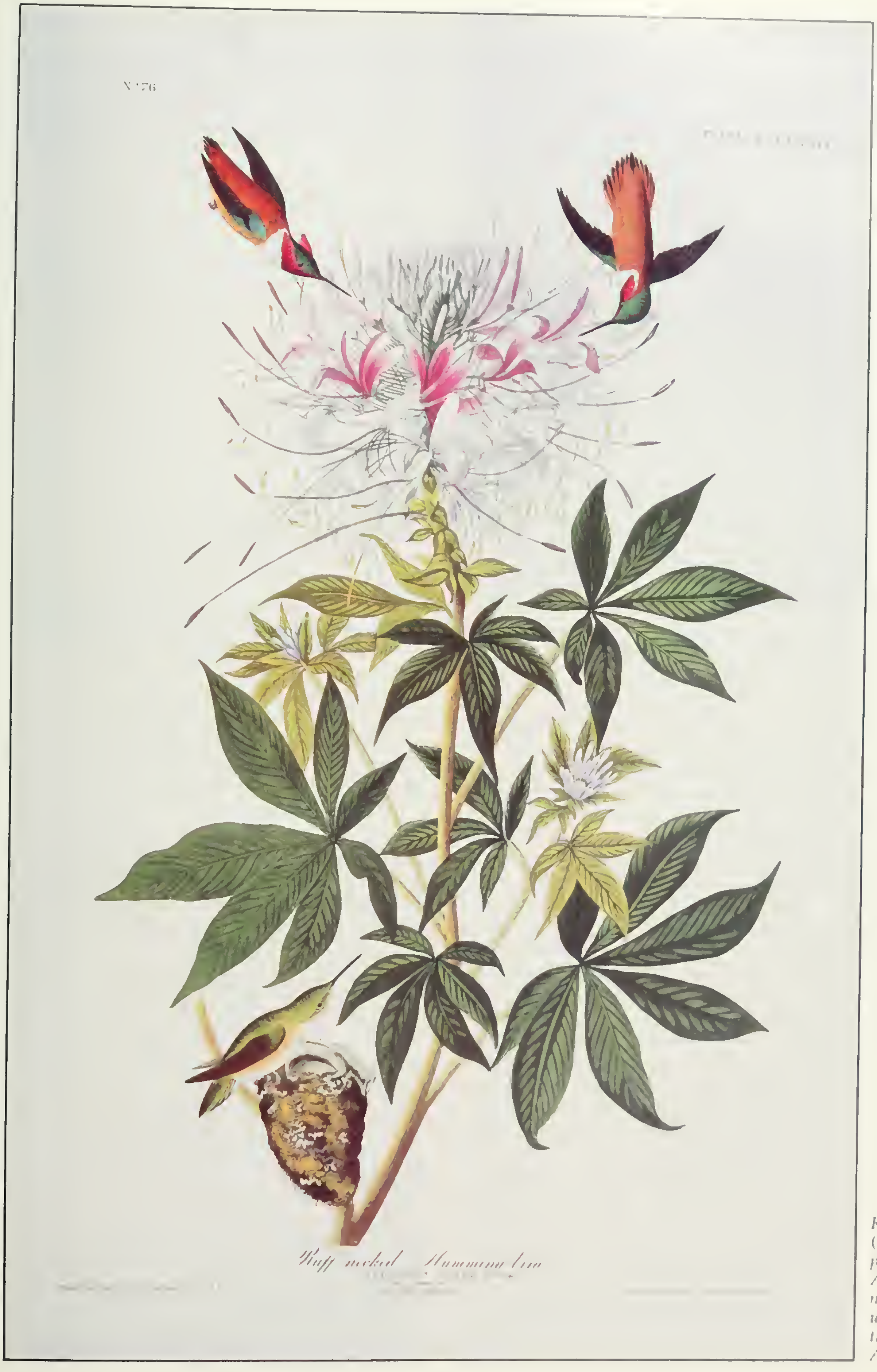
HUMMINGBIRDS, which more than deserve Audubon's flattering description, constitute the New World family *Trochilidae*. This family is a showcase of color, from iridescent greens and blues to brilliant patches of ruby, violet and emerald.

The ruby-throated hummingbird (*Archilochus colubris*) is the only member of the family which breeds in North America east of the Mississippi, but in the west twelve additional species may be found, including the widespread rufous hummingbird (*Selasphorus rufus*) and the calliope hummingbird (*Stellula calliope*), which is the smallest bird to breed in this country. Less than three inches long, the calliope is metallic green above, white below; the male has a striped bib of white and iridescent purple feathers. In many hummingbirds, including the ruby-throat, it is the male which has the most brilliant plumage, while females are of more subtle greens and whites.

Hummingbirds are a predominantly tropical family, and their numbers increase dramatically to the south. In Central America are found about 60 species; in South America there is a dazzling menagerie of over 250 species, which includes birds with such evocative names as the ruby-topaz hummingbird, the tufted coquette, the [illegible] brilliant, the green-tailed golden-[illegible] as the odd sickle-billed hummingbird. [illegible] species from montane forests has [illegible] long as its four-inch body [illegible] in a semicircle. The bill is [illegible] tubular orchids whose [illegible] birds and insects. [illegible] of food for all hummingbirds. However, few people realize that hummingbirds also feed on small insects and spiders, from which they derive much of their protein.

While insects are an important secondary food, it is nectar feeding which has been of primary importance in shaping the forms and habits of hummingbirds through natural selection. Many of the attributes which make hummingbirds unique, including their long bills, high metabolism, and ability to hover motionless or even fly backward, are specializations for nectar feeding. When a hummingbird feeds on the nectar of a flower, it inadvertently picks up pollen in the feathers of its forehead or throat and carries it to other flowers, cross-pollinating them in the process. By mixing the parents' genes, cross-pollination increases the genetic variability of the offspring. Therefore, the plants, as well as the hummingbirds, benefit when hummingbirds feed on nectar. This symbiotic relationship has also influenced the flowers which are pollinated primarily by hummingbirds to develop certain distinctive specializations, such as red coloration, long floral tubes, and copious supplies of nectar. Neither the hummingbirds nor the bird-pollinated flowers could have evolved without the other, and to understand the evolution of either group, both must be studied.

A wide variety of birds will occasionally visit flowers for their nectar, although most do not pollinate them. It is thought that an ancestor of the hummingbirds, probably an insectivorous bird resembling the modern day swifts and with the same ability to catch insects while flying, began to visit flowers on a casual basis. This may



*Rufous hummingbird* (Selasphorus rufus) *painted by John Jam Audubon (Cu names super used by Au tive to w Americ*

*Ruby-throated hummingbird (female) on petunia.*

John H Gerard

have been to catch insects within the flowers as well as to feed on nectar. Or it could have been to drink the drops of water that accumulate in flowers. Many tropical and desert birds are known to find water in this way. In any event, the ancestors of hummingbirds presumably came to certain flowers with enough regularity that they began to cross-pollinate them.

There existed at the time a system of highly evolved insect pollination, indicating that there was strong competition among plants for pollinators. If competition for the attention of insect pollinators was strong, casual pollination by birds would have led to selection favoring further development of characters that made flowers attractive to birds, and of characters which brought cross-pollination by birds. As a result of such selection, certain flowers, which had at first been pollinated by birds infrequently, soon developed specializations which made them dependent on birds. These specializations are unique to flowers which are pollinated by birds, a combination known as the ornithophilous syndrome. This syndrome is especially easy to describe in North America, because here bird-pollinated flowers are more similar to one another than in the tropics. But while there is more variety in the length of the floral tube and the color of the flowers in the tropics, these flowers also share many of the basic traits of bird-pollinated flowers.

Examples of hummingbird-pollinated flowers [illegible] include the bee-balms of the [illegible] of sages in the genus [illegible] paint brushes in west- [illegible] (*Castilleja*), also many [illegible] *Penstemon*, two [illegible] creeper (*Campsis radi-* [illegible] its large, orange [illegible] flowers, is one of the most beautiful of our cultivated plants and is native to eastern North America. Through cultivation its range has been extended from the southeastern states northward into northern New England, and it is a common source of nectar for the ruby-throated hummingbird in these areas.

Like most flowers which are pollinated primarily by hummingbirds, the trumpet-creeper is red, funnel-shaped, and has thick petals. It also produces a large quantity of watery nectar. These characters and a number of less obvious ones evolved in response to pollination by birds, and serve various functions which include attraction of hummingbirds, exclusion of other nectar feeders, and protection of the reproductive organs from the sharp bills of the hummingbirds. Bird-pollinated flowers have also developed mechanisms which function to make transportation of pollen and fertilization of the flowers more efficient.

Attractive mechanisms reflect the fact that although hummingbirds have a poor sense of smell, they are able to perceive colors in roughly the same spectrum as humans. Hummingbird flowers seldom have strong scents, but are usually colored bright red or scarlet, so that they stand out clearly against a background of greenery. Bees do not perceive light in the red end of the spectrum, so the color red has the double advantage of being conspicuous to hummingbirds and inconspicuous to bees. Bee-pollinated flowers are not red, are scented, and many have ultraviolet markings which are visible to bees but invisible to birds.

Selection favors characteristics of a flower which limit access to nectar only to those animals which are most likely to pick up pollen while feeding and carry it to another flower of the same species. For this reason the red coloration of bird flowers, making them inconspicuous to insects, has been favored through selection as an exclusive, as well as an attractive, mechanism. There is one further selective advantage for those flowers which have converged on red as their advertising color. If most flowers use the same signal to attract hummingbirds, then it is easier for the hummingbirds to recognize them.

Some of the most interesting examples of the advantages of red coloration are found in groups where a bird-pollinated species can be compared with closely related species that are pollinated by insects. The buckeye trees of the genus *Aesculus* include the imported horse-chestnut and the native Ohio and sweet buckeyes. They typically have white or yellow, cup-shaped flowers which are bee-pollinated. However, the red buckeye (*A. pavia*) has bright red, tubular flowers which are pollinated by the ruby-throated hummingbird. The cardinal flower (*Lobelia cardinalis*) is also unique in its genus because it is bird pollinated. Other lobelias are bee pollinated and their flowers are blue, but the cardinal flower's longer, tubular flower is a striking red.

It is easier to explain the present functions of red color in these two flowers than to imagine how this trait could have first evolved. However, owing to the nature of the pigmentation in the flowers of these two genera, a small, accidental mutation could easily have produced the first red flower, which if it had been pollinated by hummingbirds could have passed its color on to its offspring. Further changes in response to bird pollination could then have developed.

Most yellow flowers, including those of the buckeyes, have structures called chromoplasts, which contain carotenoid pigments; it is these pigments which are responsible for the yellow color. Chromoplasts with a similar carotenoid pigment, are also found in some red flowers, so the actual differences between a red and a yellow flower may be fewer than their appearances would suggest.

Most blue flowers, including the lobelias, are colored by anthocyanin pigments which are dissolved in the cell sap. These pigments owe their color to the acidity of the cell sap, being blue or violet when alkaline, and red when acid. In this case also a subtle chemical change could have produced a dramatic change in color. Because many blue- and yellow-flowered species happen to have a capacity for evolving into red-flowered forms, they have what is termed a preadaptation for hummingbird pollination. Therefore it is not surprising that many hummingbird flowers belong to groups whose predominant color is blue or yellow.

John H. Gerard

Salvia

John H. Gerard

Indian paint brush

Nectar is the reward a hummingbird receives once it has been attracted to a flower, and flowers must have plenty of nectar to be attractive to hummingbirds. The sensitivity of hummingbirds to the amount of nectar in a flower was demonstrated in a recent study. Ruby-throated and black-chinned hummingbirds (*Archilochus alexandri*), feeding on the flowers of *Malvaviscus arboreus* in Texas, were found to prefer new flowers to the two-day-old flowers, which had slightly less nectar.

The nectar of bird flowers differs from that of other flowers in several ways. Most obvious, there is more of it. This reflects the fact that hummingbirds are much larger than most insects, and need more food. The energy cost to a hummingbird of visiting many flowers with small amounts of nectar in them could be prohibitive. For the hummingbird, a single flower with gallons of nectar would be ideal, but such an arrangement would not be to the advantage of the flower, because the hummingbird would not spread its pollen.

Selection has favored a balance between the reproductive advantages for the plant which arise if the pollinator visits more plants, and the energetic costs to the pollinator of having to visit more plants, and this balance is different for different pollinators. Insect-pollinated flowers

Cardinal lobelia

John H Gerard

rarely have more than 5 milliliters of nectar, but bird-pollinated flowers usually have more than 10 milliliters. Some have considerably more than this. For example the coral tree's flowers contain about 15 milliliters, or ½ ounce, of nectar, and the spear lily (*Doryanthus*) produces 30 or more milliliters of nectar a day. The nectar of bird flowers contains less sugar and more water than the nectar of other flowers. Bird flower nectar averages about 30 percent sugar by weight, while insect flower nectar may be twice this concentration. This may be related to the high metabolism of hummingbirds, which is among the highest of any warm-blooded vertebrates, requiring a large amount of water for thermoregulation. The lower sugar content of bird flowers also acts as an exclusive mechanism, making them less attractive to insects.

In hummingbird flowers, nectar is located at the base of a long, narrow floral tube, which is out of reach to most insects but easily reached by hummingbirds with their long tongues and bills. The only insects able to reach this nectar are the occasional bees which chew through the corolla to steal nectar, and some of the longer tongued butterflies and diurnal moths. It is the exclusive function of these long floral tubes which has made them a common feature of all hummingbird-pollinated flowers.

The presence of a long floral tube may explain why a disproportionate number of hummingbird flowers in North America are sympetalous dicotyledons. The flowers of this group, which have a basic tubular structure, required little modification to become bird flowers. Flowers which do not have a sympetalous corolla required greater modification to reach the typical structure of a bird flower. In the fire pink (*Silene virginica*), for example, there is a long, tubular calyx which holds the petals together to form a tube. In the columbine *(Aquilegia canadensis)* the petals have developed long spurs pointing upward, each containing nectar at the top, so in effect this flower has five floral tubes in which hummingbirds can probe for nectar.

The bill of a bird is capable of doing serious damage to a flower, and hummingbird flowers have had to evolve ways of protecting themselves from damage by feeding birds. For this purpose the ovary is usually separated from the nectary, and is beneath the floral chamber, or placed on a stalk separating it from the nectaries, or protected by a wall made from the bases of the stamens. In hummingbird flowers of the genus *Penstemon* (the beard-tongues) the nectaries are located at the bases of the two upper stamens, and the thickened stamen bases are between the ovary and the nectaries, protecting the ovary from damage by feeding birds. Fifteen species of beard-tongues are pollinated by hummingbirds in western North America. The eastern species of the genus are bee pollinated, and have the nectaries located in the more usual position, at the base of the ovary. In contrast to the red coloration of bird-pollinated species, the eastern species are blue and white.

Another general adaptation to bird pollination is the development of thicker, stronger flowers. The petals of bird flowers are thick, and the pistil and stamens are usually very strong. A fascinating adaptation to bird pollination is found in many orchids of the American tropics. Species which evolved from bee-pollinated an-

*Continued on p. 21*

*Opposite:* [illegible] underw[illegible] *in South Am*[illegible] *Photo by Dav*[illegible] *Willard.*

# Fourth Annual Festival of Anthropology On Film

FIELD MUSEUM OF NATURAL HISTORY
West Entrance

Saturday and Sunday, September 26 and 27, 1981
10:30 a.m. — 5:00 p.m.

*A special invitation to explore the rich diversity of world culture on film*

*Overprinted photo is 1924 publicity still for film* Moana *Photo courtesy the Robert & Frances Flaherty Study Center*

KEYNOTE SPEAKER for this year's Film Festival is Monica Flaherty Frassetto, who will appear in Simpson Theatre on Saturday, Sept. 26, at 1:00 pm. Daughter of Robert Flaherty, the brilliant documentary filmmaker *(Nanook of the North, Moana, Man of Aran)*, Ms. Flaherty Frassetto has been involved since 1975 in developing an authentic soundtrack for her father's 1926 silent masterpiece *Moana of the South Seas.* With the assistance of some of the film's original Samoan participants, she has recorded and synchronized the natural sounds, chants, and dance music to match *Moana's* sparkling visuals.

There is a special screening on Saturday of the new sound version of *Moana* at 1:00 p.m. in James Simpson Theatre. Special screenings of *Nanook of the North* and *Man of Aran* are also featured on Saturday.

In addition, the Festival includes films grouped into eight subject areas: Religious Phenomena and Ritual, Performing Arts, Anthropological Methods: Fieldwork, Australia: The Outback and Down Under, The First Americans, and Humor, Irony, and Parody. There is a special day-long program Sunday in James Simpson Theatre entitled "The Borderlands of Science" which examines pseudoscientific topics — the fringes of anthropology — with such films as *The Shroud of Turin, Bigfoot, Poto and Cabengo, The Jolo Serpent Handlers*, and more.

Films are screened in James Simpson Theatre, in Lecture Hall 1 (A. Montgomery Ward Hall), and in Lecture Hall 2, all at the West Entrance of the Museum. The Festival schedule is subject to change. Consult final schedule for exact time and location. Please use the coupon on the fourth page of this program announcement to order tickets. A final film schedule will accompany the tickets mailed to you. Complete "Film Notes" are available at Festival. Call (312) 322-8854 for further details.

## Saturday, September 26, 1981

*10:30 am – 5:00 pm* *Simpson Theatre*

### I The Flaherty Genius

*Nanook of the North* (1922) 64 min.
Robert Flaherty
One of the greatest documentaries ever made, this restored version of *Nanook* is a timeless, beautiful saga of an Eskimo family pitting their strength against the inhospitable arctic

*Moana of the South Seas* (special 1:00 p.m. screening) 85 min.
Robert Flaherty
A new sound version of the classic by Monica Flaherty Frassetto *Moana* is about Samoan culture as it was in 1923 on the island of Savai'i. The treatment of village life is authentic, with footage on turtle fishing, boar hunting, canoe handling, fire making, tattooing and tapa cloth making. Monica Flaherty Frassetto (daughter of Robert Flaherty) has created a new soundtrack and discusses how the project evolved, the challenges she faced, and the reaction of the original film cast to the new version.

*Man of Aran* (1934) 77 min.
Robert Flaherty
The people of Aran, a barren island off the coast of Ireland, engage in a daily battle to survive — defying thunderous seas for fish, and raising potatoes in seaweed. In the courage and simplicity of their lives is an epic story of human struggle.

*10:30 am* *Lecture Hall 1 (A. Montgomery Ward Hall)*

### II Religious Phenomena and Ritual

*The Eleven Powers* (1978) 48 min.
Larry Gartenstein
Bali was the scene of one of the most spectacular and sacred festivals to occur in this century. Once every 100 years the Festival of the Eleven Powers is held to restore the balance between good and evil.

*Spirit Possession of Alejandro Mamani* (1976) 30 min.
Hubert Smith
This award-winning film portrays an Aymara Indian of Bolivia as he faces old age and death. Blessed with wealth but not happiness, he believes he is possessed by evil spirits.

*Les Maitres Fous (The Mad Masters)* (1955) 35 min.
Jean Rouch
Rouch was asked by the Hauka sect of West Africa to film their annual religious ceremony in which they enter trance and are possessed by the spirits of Western technology and colonial power. A remarkable film.

*Via Dolorosa* (1978) 10 min.
Georges Payrastre
Each year in Guatemala, the passion of Christ is celebrated by decorating the streets with colored sawdust and flower carpets as the people take turns carrying the image of their faith along "The Painful Way."

*Manifestations of Shiva* 60 min.
Malcolm Leigh
A beautiful film showing the worship of the Hindu god Shiva on a personal level through dance, art, music, and ritual. Without narration.

*Bronx Baptism* (1980) 24 min.
Dee Dee Halleck
A non-narrated film that records the dramatic emotional responses to baptismal rituals of Hispanic Catholics involved in New York City's largest Pentecostal church

*Kataragama: A God for All Seasons* 60 min.
A captivating film on ecstatic religion and burial preparations in Sri Lanka

*2:30 pm* *Lecture Hall 1 (A. Montgomery Ward Hall)*

### III Folklore and Mythology

*Arrow to the Sun* 12 min
Gerald McDermott
An animated legend from the Acoma Pueblo Indians

*Black Dawn* 20 min.
A superbly animated Haitian folktale with emphasis on music, history, art, and folklore

*The Bird, The Fox, and the Full Moon* 11 min.
Eduardo Darino
A folk tale from South America.

*I Ain't Lying: Folktales from Mississippi* 22 min.
The Center for Southern Folklore
Tales of gravediggers and rich old ladies, preachers and alligators and brotherly meetings in hell.

*The Golden Lizard: A Folktale from Mexico* 19 min.
An award-winning dramatization of a Mexican folktale

*The Story of Good King Huemac* (1979) 21 min.
Richard Fichter
Puppet animation of a Toltec legend.

*Korochan, the Little Bear* 11 min.
Elizabeth Graf
A Japanese fairy tale for children.

*Native American Myths* 24 min.
Alan P. Sloan
Five animated Native American legends

*How Death Came to Earth* (1972) 14 min.
Based on an East Indian fable, this film combines a limited number of narrated passages with shimmering animation to tell the story of how death was brought to earth.

*10:30 am* *Lecture Hall 2*

### IV Anthropological Methods: Fieldwork

*A Man Called "Bee:" Studying the Yanomamo* (1974) 40 min.
Timothy Asch and Napoleon Chagnon
Shows Chagnon engaged in fieldwork with the Yanomamo of Venezuela — collecting data, interacting with the people, filming their lives.

*Knud* (1968) 31 min.
Brought up on the stories of the arctic, Knud Rasmussen fulfilled childhood dreams and became a famous arctic explorer. He became fluent in Eskimo languages and discovered a fresh view of life in their ideas.

*Other People's Garbage* (1980) 60 min.
Ann Peck
Historical archeologists use unique combinations of resources including oral history, public records, and excavations, to uncover America's recent past.

*2:30 pm* *Lecture Hall 2*

### V Artists and Performers

*The Stilt Dancers of Long Bow Village* (1981) 27 min.
Carma Hinton and Richard Gordon
A remarkable film that documents the revival of stilt dancing in a rural Chinese village. Banned for nearly ten years during the Cultural Revolution, the dancing is a traditional Chinese folk art that combines myth, history, contemporary politics, and daily village life.

*Adama, The Fulani Magician* 22 min.
Jim Rosellini
An entrancing film portrait of renowned deaf African street performer and practitioner of the ancient *Yantaori* magic tradition.

*The Royal Dancers and Musicians of the Kingdom of Bhutan*
30 min. The Asia Society, New York

Documents the spectacular dance-dramas of Bhutan, a remote Himalayan mountain kingdom. Ornate costumes and masks are used to enact stories from Bhuddist legend and Bhutanese folklore.

*Maxwell Street Blues* (1980) 56 min.
Williams and Zaritsky

Explore the tradition of blues and gospel music as still played in Chicago's Maxwell Street open air market.

*Quilts in Women's Lives* (1980) 28 min.
Pat Ferrero

The lives and art of seven women who make quilts. This award-winning film presents the women's views on the inspirations of family, tradition, and the creative process that go into the art of quilt-making.

## Sunday, September 27, 1981

*10:30 am – 5:00 pm* *Simpson Theatre*

### VI THE BORDERLANDS OF SCIENCE

*Left Brain, Right Brain* 56 min.

This fascinating exploration discusses the geography of the brain, the asymmetrical evolution of the brain from primates to human beings and neurological phenomena.

*Poto and Cabengo* 77 min.
Jean-Pierre Gorin

Poto and Cabengo are two California sisters who speak in a private language understandable only to themselves. Scientists have been studying their speech patterns to try to determine how and why they communicate in this way.

*Koko, A Talking Gorilla* 85 min.
Barbet Schroeder

Koko, a six-year-old gorilla, has been taught to express herself through sign language. A moving speculation about the tenuousness of humanity's separation from the world it exploits.

*Bigfoot* 60 min.

Explore the arguments about manlike monsters as well as the psychological and mythological influences that affect our perceptions of them in this intriguing, sometimes far-fetched film.

*The Silent Witness* 55 min
David W. Rolfe

Mystery and speculation have surrounded the Shroud of Turin since its discovery in the 14th century. Is it Christ's burial shroud or a masterful medieval forgery?

*The Jolo Serpent Handlers*. 40 min.
Karen Kramer

A group of Fundamentalists in Appalachia handle poisonous snakes and drink strychnine during religious services to demonstrate their belief in the proof of God.

*The Case of the Ancient Astronauts* 57 min.

Have ancient astronauts already visited us on earth? Did they erect the pyramids of Egypt and the monoliths on Easter Island? NOVA takes a hard look at the theories of Erich von Daniken, author of *Chariots of the Gods*

*10:30 am* *Lecture Hall 1 (A. Montgomery Ward Hall)*

### VII SCENES FROM NATIVE AMERICAN LIFE

*The Chaco Legacy* (1980) 58 min.
Graham Chedd

The history and archeology of Chaco Canyon, New Mexico, where ancient architects undertook one of the most comprehensive building projects ever. An extensive water control system, a road network connecting 70 pueblos, and the 800 room Pueblo Bonito were built 900 years ago by the inhabitants of Chaco Canyon.

*Neshnabek. The People* (1979) 30 min.

Documents the daily life and ceremonial activities of the Neshnabek — the Prairie Band Potowatomi of Kansas — through footage taken in the 1930s and the people's own stories and conversations

*Shinnecock: The Story of a People* (1976) 20 min.
Joseph E. Miller

The Indians of the East Coast regions were the first to come in contact with the white settlers as they arrived from Europe. Consequently, they were the first to lose much of their own culture. The film attempts to bring back some of that lost heritage.

*Monica Flaherty Frassetto (rt.) and two local chiefs in 1975 on Samoan island of Savai'i. Chief Taulealea Usumai (left) appeared in the film* Moana *Courtesy Sarah Hudson.*

*Monica Flaherty Frassetto (left) and older sister Barbara in Samoa in 1924. Courtesy the Robert & Frances Flaherty Study Center.*

*Augusta* (1978) 17 min.
Ann Wheeler
The story of Augusta Evans, daughter of a Shuswap chief; she was kidnapped at age four and sent to a Catholic mission where only English was spoken. She later married a white man, losing her Indian status. This film includes an interview with Augusta in her 80's.

*Crow Dog's Paradise* (1979)
Two contemporary expressions of Native American life: a traditional Dakota Sioux medicine man and his son, an active member of the American Indian Movement.

*The Divided Trail: A Native American Odyssey* (1978) 33 min.
Jerry Aronson
Two Chippewas (brother and sister) and friend migrate from a Wisconsin reservation to the Chicago slums. 1979 Academy Award nominee.

*1:00 pm* *Lecture Hall 1 (A. Montgomery Ward Hall)*

### VIII AUSTRALIA: THE OUTBACK AND DOWN UNDER

*Waiting for Harry* (1980) 57 min.
Kim MacKenzie
In July, 1978, a group of Aborigines of northern Australia prepared an elaborate funeral ceremony for an esteemed tribe member.

*Narritjin at Djarrakpi* (1980) 50 min.
Ian Dunlop
Narritjin, chief of his aborigine clan, is a well known painter.

*My Survival as an Aboriginal* 50 min.
Essie Coffey
Autobiographical film about an aboriginal woman struggling to preserve her people's rights.

*10:30 am* *Lecture Hall 2*

### IX HUMOR, IRONY AND PARODY

*Banana I* (1978) 4 min.
Norman Magden
An absurdist lecture, conjugating the nonexistent verb "banar."

*Garlic is as Good as Ten Mothers* (1980) 51 min.
Les Blank
"Fight Mouthwash… Eat Garlic." A film on the history, consummation, culture, curative powers, and culinary art of eating garlic. Gastronomical anthropology at its best.

*Time* 4 min.
National Film Board of Canada
Animated film about a man who has four minutes to live…and the five emotional stages through which he passes—denial, anger, depression, preparatory grief, and acceptance.

*Ricky and Rocky* (1973) 18 min.
Jeff Kreines and Tom Palazzolo
A backyard "surprise" bridal shower filmed as cinéma vérité.

*Possum Living* (1980) 29 min.
Nancy Schreiber
20-year-old Dolly Freed supports herself and her father in a Philadelphia suburb on less than $2,000 a year by practicing her own home-grown economic plan. And the last thing she thinks about is a nine-to-five job.

**Fourth Annual Festival of Anthropology on Film**
*September 26 and 27, 1981*

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## HUMMINGBIRDS

*Continued from p. 16*

cestors have a bump, or callus, on the inside of the floral tube which forces the bird's bill against the column and into the nectary, so that it cannot damage other parts of the flower in the process of feeding. Interestingly, this is not found in those orchids which developed into bird flowers from butterfly-pollinated ancestors. These species are often pollinated by both butterflies and hummingbirds, as is the case with *Epidendrum secundum*, and this may be one reason why they do not show the dramatic modifications of the orchids which developed from bee-pollinated ancestors.

All plants which are pollinated by animals, in contrast to wind-pollinated flowers, for example, have sticky pollen. In typical bee flowers this pollen is brushed onto the back of the visiting insect as it crawls into the flower to feed. But because pollen sticks better to feathers than to bills, the pistil and stamens of bird flowers must project beyond the flower to contact the head of a visiting bird.

A good example of this trait is found in the cardinal flower, which bears beautiful red flowers in wet meadows and stream banks of the eastern states in late summer. Long stamens project from a split in the upper lip of this flower, forming a long conical stalk, with a tight group of anthers at the end. The anthers form a tuft of bristles, which a hummingbird must push beyond to extract nectar from the flower. In the process, pollen is transferred to the forehead of the bird. As the flower ages and the pollen is dispersed, stigmas at the end of a long style enclosed by the stamens will protrude beyond the anthers to collect pollen from the heads of birds which have visited younger flowers and picked up pollen. This pollen will then travel down the style and into the concealed ovary. Because the stamens in this flower mature first and their pollen is dispersed before the stigma is mature, there is little chance that a flower will be fertilized by its own pollen.

The cardinal flower is an excellent example of a typical North American hummingbird flower, and has many of the other characteristics of ornithophilous flowers as well. It has a larger, stronger, and longer-tubed flower than other lobelias, and is red in comparison to, for example, the blue of its close relative the great lobelia (*Lobelia syphilitica*), which is pollinated by long-tongued bees. These two species illustrate one final distinguishing feature of hummingbird flowers. The great lobelia's petals form a sturdy landing platform for visiting bees, but this is lacking in the cardinal flower. Bird flowers which evolved from bee-pollinated ancestors have lost these landing platforms, perhaps as an exclusive mechanism. Hummingbirds, of course, do not need landing platforms, because they feed while hovering in front of the flower.

As hummingbird flowers developed their special features, so too did the hummingbirds. The primary adaptation for nectar feeding was clearly the development of a long tubular tongue and long bill. The hummingbird tongue is made up of two overlapping segments which form a long tube to suck nectar from flowers. Hummingbird bills are also unique and important in nectar feeding. The shape of bills has been determined by the shape of the flowers upon which the hummingbirds feed. Hummingbird bills are long and thin, and the majority of them curve downward slightly at the end, as the corollas of many hummingbird flowers are slightly curved. Some hummingbirds have fairly short bills, but most are close to an inch in length, which is fairly long considering that hummingbirds average only three or four inches in length. There are, however, many examples of long and oddly shaped bills. For instance, the swordbilled hummingbird (*Ensifera ensifera*) has a bill 12 or 13 centimeters long, while the bird is only 21 centimeters, or 8 inches, in length, including the bill and tail. Also unique is the fiery-tailed awlbill (*Avocettula recurvirostris*), one of the few hummingbirds with an upturned bill.

Hummingbirds are remarkable in their ability to hover at flowers, or even fly backwards when necessary, and their unique flight seems related to their habit of feeding at flowers. If the aerodynamics of an ordinary bird wing resembles that of an airplane wing, the hummingbird wing has more in common with the rotary of a helicopter. The hummingbird wing has been modified so that it beats sideways more than up and down, and the wing itself is held in an almost vertical plane. With each forward and backward stroke the wings generate lift, while other birds' wings give lift only on the downstroke. Further, the outer portion of a hummingbird's wing, beyond the wrist joint, is usually long compared to the inner portion of the wing. In many other birds the relatively motionless inner section gives lift for gliding flight; but in the hummingbirds, which do not glide, the inner portion moves with the rest of the wing. Hummingbirds also have a unique shoulder socket which allows the wing great mobility.

These adaptations have given the hummingbird the ability to hover at flowers, and to make a fast getaway at up to thirty miles per hour. But hummingbird flight is energy intensive, requiring relatively enormous flight muscles and wing beats so fast (nearly 80 beats per second in some species) they are a blur to the eye.

Their unique flight, coupled with small body size, necessitates a very high metabolism; and without large quantities of nectar along with the protein from insects and spiders, this metabolism cannot be maintained for more than a few hours.

To survive periods of scarce food, bad weather, or a cold night, hummingbirds are able to enter a state of torpor in which the heart beats slowly and metabolic needs are greatly reduced. Crawford H. Greenewalt (author of *Hummingbirds*, New York, 1960), who has studied the flight of hummingbirds for years, made some calculations which make it easier to comprehend the remarkable nature of hummingbird metabolism. He figured that, "If a 170-pound man led the equivalent of a hummingbird's life, he would burn up 155,000 calories a day and evaporate about 100 pounds of perspiration an hour. If his water supply ran out, his skin temperature would soar above the melting point of lead, and he would probably ignite."

The relationship of a tube-shaped tongue and long bill to nectar feeding is obvious, and the effects of nectar feeding on size, metabolism, and flight are also fairly clear. But it is far more difficult to see how this could have affected other characteristics of hummingbirds, such as the fact that no male hummingbirds contribute to nest building or care of the young, and that the males are brightly colored compared with the cryptic (adapted for concealment) coloration of the females in most hummingbirds. Some males, as is true in the scissor-tailed hummingbird (*Hylonympha marcocerca*), and the racket-tailed coquette (*Discosura longicauda*), have elongated, decorative tail feathers in addition to their bright plumage. However, it is possible that even these characters are related to the symbiosis between hummingbirds and their flowers. A broad overview of other groups of small birds which like the hummingbirds are predominantly tropical reveals some patterns that help to explain the pattern found in hummingbirds.

In the flycatchers (*Tyrannidae*), whose primary food is insects, the males and females are both dull in color. Both participate in nesting and caring for the young, and food needed by the family in the nesting period is gathered from a defended nesting territory. It is thought that the requirements of insect feeding necessitate this lifestyle, for edible insects are concealed or cryptic and one bird alone could not gather enough to raise the young. Further, it is likely that by defending a territory with which they become familiar, flycatchers can forage more efficiently than if they wandered over unfamiliar areas for food.

The opposite pattern of reproduction is found in fruit-eating birds of the tropics, such as the cotingas (*Cotingidae*) and manakins (*Pipridae*). These species have symbiotic relationships with plants similar to that of the hummingbirds; except that they disperse seeds instead of cross-pollinate flowers. Selection has favored fruit which is conspicuous and easy for the birds to gather, so fruit-eating birds must spend far less time looking for their food than do insect-eating birds. This means that a female fruit eater is capable of finding enough food to raise young by herself, and a second bird would not be only unnecessary, but would make the nest and young more conspicuous to predators. In these fruit eaters, in which the male does not help raise the young, males are brightly colored and often have decorative plumage. The nature of the food resources in flycatchers and fruit eaters has made some forms of reproduction impossible and others advantageous. It is possible that nectar feeding has a similar influence on hummingbirds.

Hummingbirds have a symbiotic relationship with their food source which is similar to the relationship of fruit eaters to their fruit, and contrasts with the predatory relationship of

*Great blue lob*

n H. Gerard

*Left* Eulampsis jugularis *native to Lesser Antilles; right* Aglaeocercus kingi *native to South America. Photos by David Willard*

flycatchers to insects. The availability of nectar means that a single hummingbird can easily gather enough food to raise young, and makes it possible for males to be promiscuous instead of helping at the nest. If males do not tend the nest, they are not subject to the selective pressure to maintain cryptic coloration, a device favoring nest concealment. Therefore, nectar feeding made possible the divergence in male and female plumages. It is clear that nectar feeding has had a profound influence on the evolution of hummingbirds, even though it is not always clear how direct or immediate this influence has been.

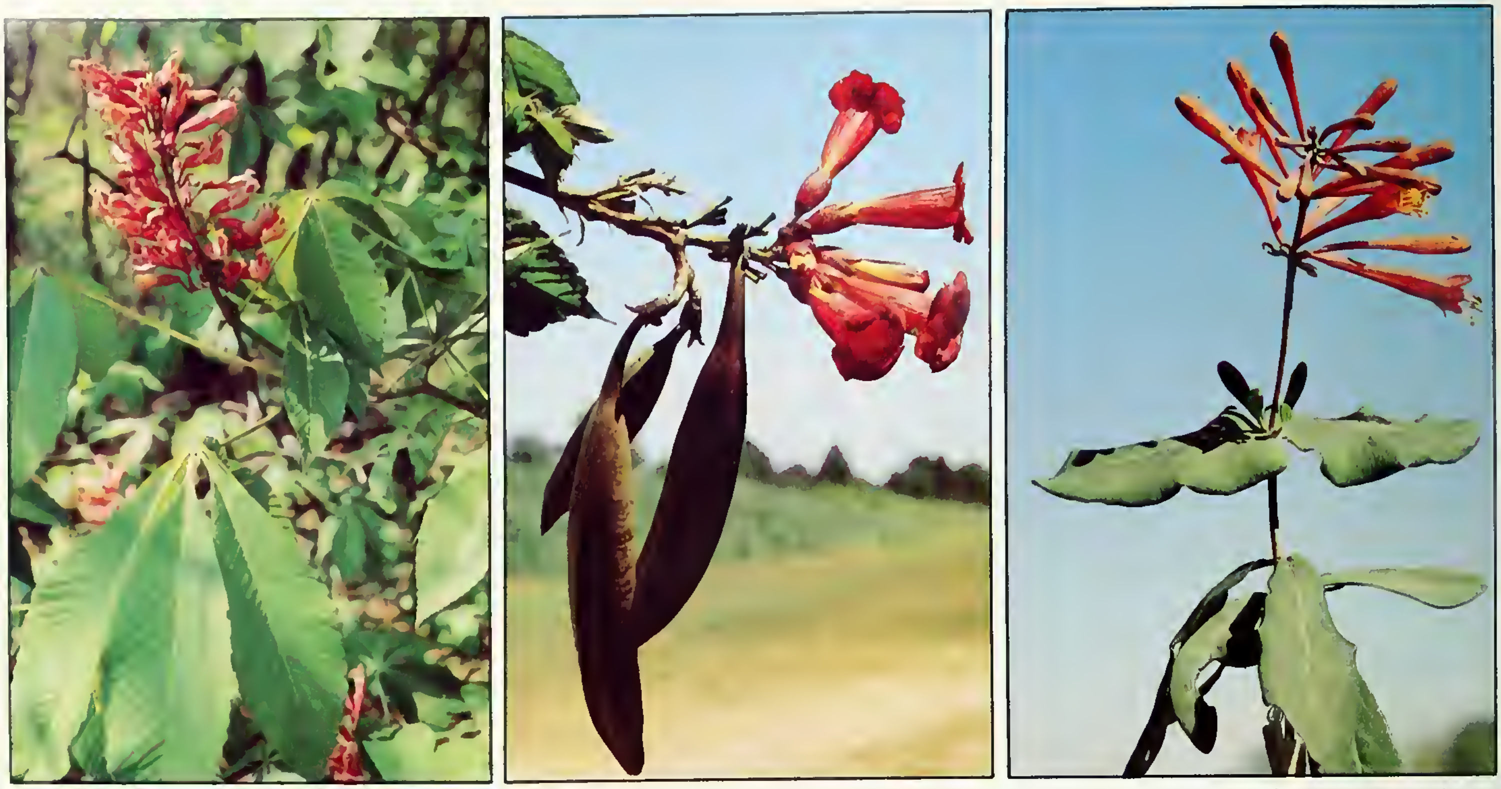
It is likely that further research will find a stronger influence on some characters than is considered to be the case today. For example, little research has addressed the question of why hummingbirds have iridescent patches of certain colors, but there is a pattern to the distribution of these colors which suggests that this may also be related to the flowers which hummingbirds feed on. Those hummingbirds which breed in North America have red or purple throat patches, while in Central and South America many birds have patches of bright blue, gold, or orange, as well as red. This difference echoes differences in the coloration of hummingbird flowers. In North America, hummingbird flowers are predominantly red, but in the tropics there are more flowers of other bright colors. No good reason for this parallel has been proposed.

The dependent relationship of hummingbirds and their flowers has produced through natural selection a series of specializations, some directly related to nectar feeding and pollination, and some only related indirectly. But no aspect of the life of these flowers and birds is entirely beyond the influence of this relationship, and its importance is demonstrated by the occurrence of similar adaptations in ornithophilous flowers and nectar-feeding birds from other parts of the world.

Approximately one third of the 300 or so families of flowering plants have some species in them which are pollinated primarily by birds, and there are many more species which are pollinated casually by birds, and have insects for primary pollinators. About 85 percent of the bird-pollinated flowers throughout the world are red, and most also share the tubular shape and some of the other structural adaptations which characterize the bird flowers. There are eight families of birds in which are found over 1,600 species with special tongue and bill adaptations for feeding at flowers. These birds include the brush-tongued parrots (*Psittacidae*), hummingbirds (*Trochilidae*), flower-peckers (*Dicaeidae*), sunbirds (*Nectariniidae*), white-eyes (*Zosteropidae*), honey eaters (*Meliphagidae*), honeycreepers and flower-piercers (*Emberizidae*), and Hawaiian honeycreepers (*Drepanididae*).

Many of these species have long bills and tubular tongues, similar to those of hummingbirds. This is true of the honeycreepers, Hawaiian honeycreepers, and sunbirds. The brush-tongued parrots of Australia have tongues adapted to feeding on the pollen of flowers. Flower-piercers of South America have bills with downturned, sharp tips, and they pierce the petals of flowers near their bases, taking nectar without cross-pollinating the flowers. However, most species effect cross-pollination while feeding on the nectar of flowers.

A striking example of convergent evolution is found in the sunbirds of the African and Asian tropics. They have tongues and bills like the hummingbirds, and are almost as small. The males are brightly colored and iridescent, the females duller, as in hummingbirds, and their colors are similar to those found in the hum-



*Left to right: red buckeye, trumpet honeysuckle, trumpet vine.*
John H. Gerard

mingbirds; but they do not hover at flowers.

Nectar-feeding birds will sometimes feed at flowers which are insect-pollinated, just as some insects can be seen feeding at ornithophilous flowers. For example, the ruby-throated hummingbird feeds on a variety of cultivars which are not primarily bird pollinated. Birds often feed on introduced cultivars, which obviously could not have evolved to be pollinated by hummingbirds. For example, they feed on the odd, pompom-shaped flowers of the albizzia (*Albizzia julibrissin*), often mistakenly called "mimosa," an Asian tree which may have been pollinated by other birds in its natural habitat. The introduced honeysuckle (*Lonicera japonica*) is frequently visited by hummingbirds, although its white and yellow flowers are usually pollinated by bees. The native trumpet honeysuckle (*L. sempervirens*), on the other hand, has typical ornithophilous flowers which are tubular, bright red on the outside, and yellow on the inside. A number of North American bird flowers share this characteristic of having bright yellow in the interior of a red flower.

Some cultivated species have been bred by researchers in such ways that they resemble in color and shape an ornithophilous flower, but may still lack the appropriate mechanisms to ensure that birds pollinate them. An example of [illegible] found in members of the genus *Gladiolus*. [illegible] specifically adapted to bird pollination, but hummingbirds are attracted to [illegible] form, which is often planted. [illegible] often attract hummingbirds [illegible] they are easy to observe. Be[illegible] speed of flight, they safely tolerate [illegible] approach before fleeing.

There are also a number of common and attractive cultivars which are true ornithophilous flowers. Bee-balm (*Monarda didyma*), a widely cultivated native of North America partial to wet stream banks in the wild, has a cluster of bright red flowers and below these many dark red bracts, helping to make the plant more conspicuous to hummingbirds. *Salvia splendens*, the scarlet sage, is a typical hummingbird flower, and often attracts them to gardens.

The trumpet creeper is also a widely cultivated hummingbird flower, and shows many of the typical adaptations to bird pollination. Bees are a secondary pollinator of this flower, and so both bees and hummingbirds can be seen feeding at it.

There is even more of interest to this plant than its adaptations to bird pollination, however. In addition to its floral nectaries, it has four extrafloral systems of smaller nectaries which are found on the petiole, corolla, calyx, and fruit. Various species of ants can be found feeding at these nectaries, and they defend the plant from insects which might feed on its fruit or rob nectar by chewing through the base of the corolla. Many plants, including *Impatiens*, have such extrafloral systems of nectaries, and these seem to be special adaptations to a symbiotic relationship with ants, in which ants feed on the nectar and defend the plant from its predators.

The coevolution of these plants with a number of ant genera has resulted in...well, that's another story in itself. There are many cases like this of symbiosis and coevolution, of which hummingbirds and their flowers are just one of the more visible examples. ☐

# TOURS FOR MEMBERS

## *Peru and Bolivia*

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This tour includes the fascinating cities of Lima, Cuzco, Trujillo, Puno, a train trip to fabulous Machu Picchu, four full days in La Paz, and a hydrofoil ride on Lake Titicaca. Dr. Alan L. Kolata, visiting assistant curator of South American archeology and ethnology, will accompany the tour members during the entire trip. Dr. Michael E. Moseley, associate curator of Middle and South American archeology and ethnology, who for the past ten years has directed large-scale projects on the north coast of Peru, will join the group when we visit his area of research. We will also have an opportunity to see and learn about Dr. Kolata's work at Tiahuanaco. For more information call or write Field Museum tours. Direct telephone line: 322-8862.

Alan Kolata

*Village festival on shores of Lake Titicaca in Bolivia. Dancers wear costumes bearing images derived from the ancient art of Tiahuanaco, an empire that ruled the southern Andes 1,500 years ago.*

**1982 Tours**

Watch for coming announcements on 1982 Field Museum Tours to Alaska (summer), Australia (fall), Kenya/Seychelles (fall), the Galapagos (winter), and India (winter). If you wish to be on the mailing list for coming brochures on any of these tours, please write or call the Tours Office, 322-8862.

Hermann Bowersox

# TOURS FOR MEMBERS

## Baja California

February 6-20, 1982

*LESS THAN 50 MILES SOUTH of the U.S.-Mexico border begins a peaceful world of subtropical beauty — the Sea of Cortez (Gulf of California). Over 600 miles long, this gulf is a paradise for marine vertebrate and invertebrate life—and for those of us who enjoy its study. Field Museum members will have the opportunity to know this sea of wonders in a voyage that will all but complete the circumnavigation of the peninsula of Baja California.*

*The tour will be led by Dr. Robert K. Johnson, associate curator of Fishes and chairman of the Department of Zoology. Special Expeditions, a division of Lindblad Travel, operators of the ship to be used, will provide several additional naturalists whose expertise will further enrich our experience. Our home for the voyage is the one-class, fully air-conditioned 143.5-foot* MV Pacific Northwest Explorer, *built in 1980.*

*Thirty persons can be accommodated; rates depend on the type of stateroom. For further information, including itinerary, write or call the Tours Office (322-8862).*

The M. V. Pacific Northwest Explorer in the Sea of Cortez. Photo courtesy Sven-Olof Lindblad.

Viewing sea lions at Los Islotes, Sea of Cortez. Photo courtesy Sven-Olof Lindblad.

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### 1982 Tours

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## OUR ENVIRONMENT

*Con't from p. 11*

songbird to have had its entire population censused. The census has been conducted on an annual basis since 1971, when the count for singing males plummeted to 201. The census occurs from mid-May to mid-June. During this period cooperators spot-check areas that appear to contain habitat suitable for the presence of singing male warblers. The areas that are found to have birds present are censused during a 10-day period in mid-June (June 6 to 15 in 1980). Because some males have been observed to change location during the summer, a short census period is used to avoid duplication.

The census is a cooperative effort of DNR, Forest Service, and Fish and Wildlife Service. Also, local Audubon Society members and independent cooperators take part. In all, a record 58 observers participated in the 1980 census.

The census takers attempt to group the warblers into colonies. Singing males are considered to be in the same colony if, and only if, when observed on the census they are no more than 1,034 meters from at least one other singing male. This at least provides a framework for discussing the spatial distribution of singing males.

### Wintering Grounds

Very little is known about the Kirtland's warbler outside its nesting range. In migration, the bird enters and leaves the continent at the coast of North and South Carolina. Apparently, the warbler's wintering range is limited to the Bahama Islands. Between October 29 and April 12 it has never been seen anywhere else. In the late 1800s, specimens were taken on nearly all the larger islands in the Bahamas, and there have been many subsequent chance sitings by tourists. With 700 main islands and about 2,400 cays and rocks, studying the Kirtland's warbler's behavior and habitat requirements on the wintering grounds is a difficult task at best.

## Endangered Cui-ui on Recovery Road

Historically, springtime marked the annual migration of the cui-ui *(Chasmistes cujus)* from Pyramid Lake, Nevada, upstream into the lower Truckee River to spawn. For centuries this event attracted the neighboring Paiute Indians from miles around, who came to harvest cui-ui (most commonly pronounced "kwee-wee") which they regarded highly as food. In recent years, however, spawning runs of the endangered fish became precariously low, bringing an end to this native American tradition. In 1969, the Paiute Indians ceased all harvest of the cui-ui and now the Pyramid Lake species is protected under the Endangered Species Act of 1973.

Imperilment of the cui-ui resulted primarily from Derby Dam and the Newlands Project, one of the earliest (1903) Federal land reclamation efforts. Derby Dam, which was constructed 40 miles upstream from the mouth of the Truckee River, caused the diversion of water down a transbasinal canal (Truckee Canal) into the Carson Basin and, thence, to agricultural lands. The resulting enormous annual drawoff caused Pyramid Lake to subside, and an extensive delta to form at the mouth of the Truckee River. Water levels decreased until, except in occasional years with abnormally high spring run-off, adult fish were unable to traverse the shallow delta to the Truckee River.

The drought of the 1930s had an additional detrimental impact on Pyramid Lake fish species. During that decade, both the cui-ui and the Pyramid Lake Lahontan cutthroat trout *(Salmo clarki henshawi)* were denied access to the Truckee River. The cui-ui, because of its longevity (they have been aged to 18 years) and ability to reproduce successfully in the few fresh water interfaces of saline Pyramid Lake, was able to maintain at least a marginal population. The Pyramid Lake strain of cutthroat trout, however, became extinct.

To ensure the survival of the cui-ui, the Pyramid Lake Paiutes and the U.S. Fish and Wildlife Service together initiated a program at Dunn Hatchery on the Paiute Indian Reservation to artificially propagate cui-ui. Fish reared at Dunn Hatchery have been periodically released into the lower Truckee River since shortly after the program began in 1973. Since 1977, the cui-ui hatchery program has been operated independently by the Pyramid Lake Tribe.

In 1976, the Bureau of Reclamation (now the Water and Power Resources Service) completed a 3-mile long fishway, which includes four fish ladders, along the Truckee River to again permit cui-ui spawners access to the river. The ladders were easily traversed by (stocked) Lahontan cutthroat trout, but water velocities proved too great for the lesser swimming ability of the cui-ui. No cui-ui used the fishway for the first two years of its operation. (The service handles the fishway operations.)

In 1978, one ladder was partially modified to reduce water velocity; as a result, 33 cui-ui traversed the entire fishway and were captured upstream in the Marble Bluff Fish Handling Facility. In 1979, the same ladder was further modified, and 146 smaller cui-ui traversed the entire fishway. These fish, plus an additional 149 spawners collected in the fishway canal, were released in the lower Truckee River to spawn. A second ladder was modified for the 1980 cui-ui run, and the results were again gratifying: nearly 5,000 spawners were collected at Marble Bluff. These fish, along with the additional 1,704 spawners were released in the lower Truckee. Recently, the remaining two ladders have been modified, and even larger releases of cui-ui into the lower Truckee River are anticipated for the 1981 season. It appears now that cui-ui are up the river to recovery.

To help ensure the recovery of the species, the service has developed the Cui-ui Recovery Plan which has as its primary objective to restore the species to a nonendangered status and reclassify it from endangered to threatened. Biologists from the Nevada Department of Wildlife, the University of Michigan, and the Pyramid Lake Paiute Indian Tribe assisted in the development of the plan.

Information called for in the plan is being researched jointly by the service's National Fishery Research Laboratory in Seattle, and the Fisheries Assistance Office in Reno. As directed by the plan guidelines, these two service groups intend to study the Truckee River life history phase of the cui-ui, document natural reproduction in the greatly man-altered lower Truckee River, and then develop the baseline information needed to maximize recruitment of cui-ui to Pyramid Lake. Determining flow requirements for optimal fish passage, spawning, incubation, and nursery habitat are integral to the study, and are emphasized in the recovery plan.

This team approach between research and operations should help assure that this unique species will recover sufficiently to allow reclassification and restoration of the cherished cui-ui fishery.

—*G. Gary Scoppettone*

## Geese for Weed Control

Over a year ago, the Idaho Seed Co., of Burley, Idaho, bought some Chinese weeder geese, a strain developed over the past 2,000 years for weed control in China, to use in place of chemical herbicides on their seed-producing farms. Today the company has more than 80,000 geese for use on 1,000 acres of carrots, peas, potatoes, onions, and lentils and enough geese left over to lease to 20 neighboring farms where they have been used to control weeds on 10,000 acres of crops. The cost of maintaining the flock equals the cost of the chemicals it's replaced, but fuel and application costs have been eliminated and excess geese are marketed. The firm has received many inquiries about the geese, including one from the National Park Service concerning the feasibility of using weeder geese in wilderness areas where chemicals are banned.

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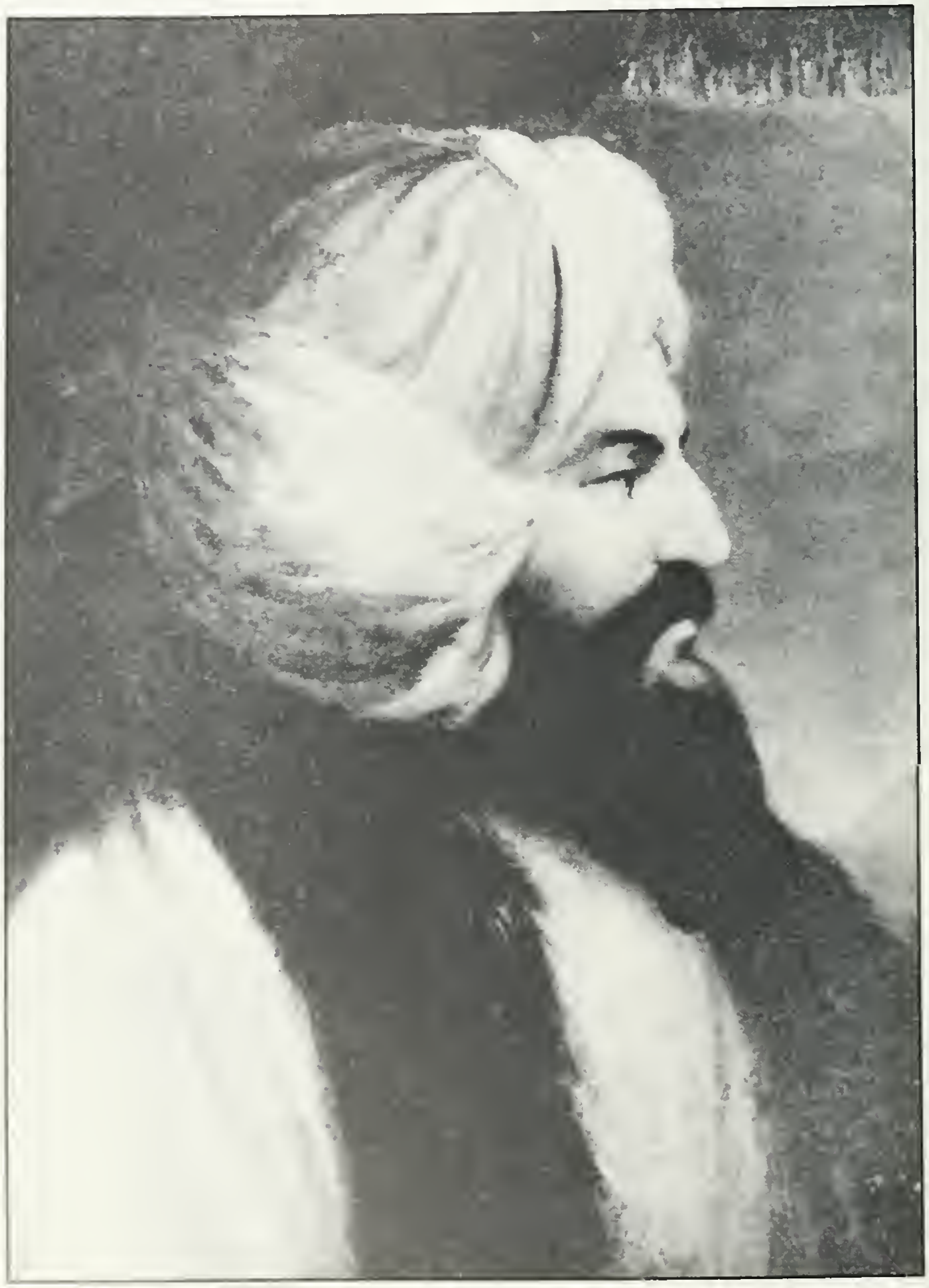
*Con't on p.* 27

# Giovanni Belzoni
# *King of the Tomb Robbers*

*by* PETER GAYFORD



*Belzoni in Arab dress*

The history of Egyptology appears before us as an epic on a grand scale—a panorama peopled by a range of personalities who, in their own unique ways, excavated the length and breadth of the Nile Valley. Perhaps the most colorful—and among the less scrupulous—of these was the Italian adventurer Giovanni Battista Belzoni (1778-1823).

A multitalented, colorful figure who might have gone far in some respectable profession, Belzoni was little more than a highly skilled grave robber. The antiquities he acquired were,

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*Peter Gayford is volunteer assistant, Middle Eastern archeology.*

*Belzoni as the Patagonian Samson*

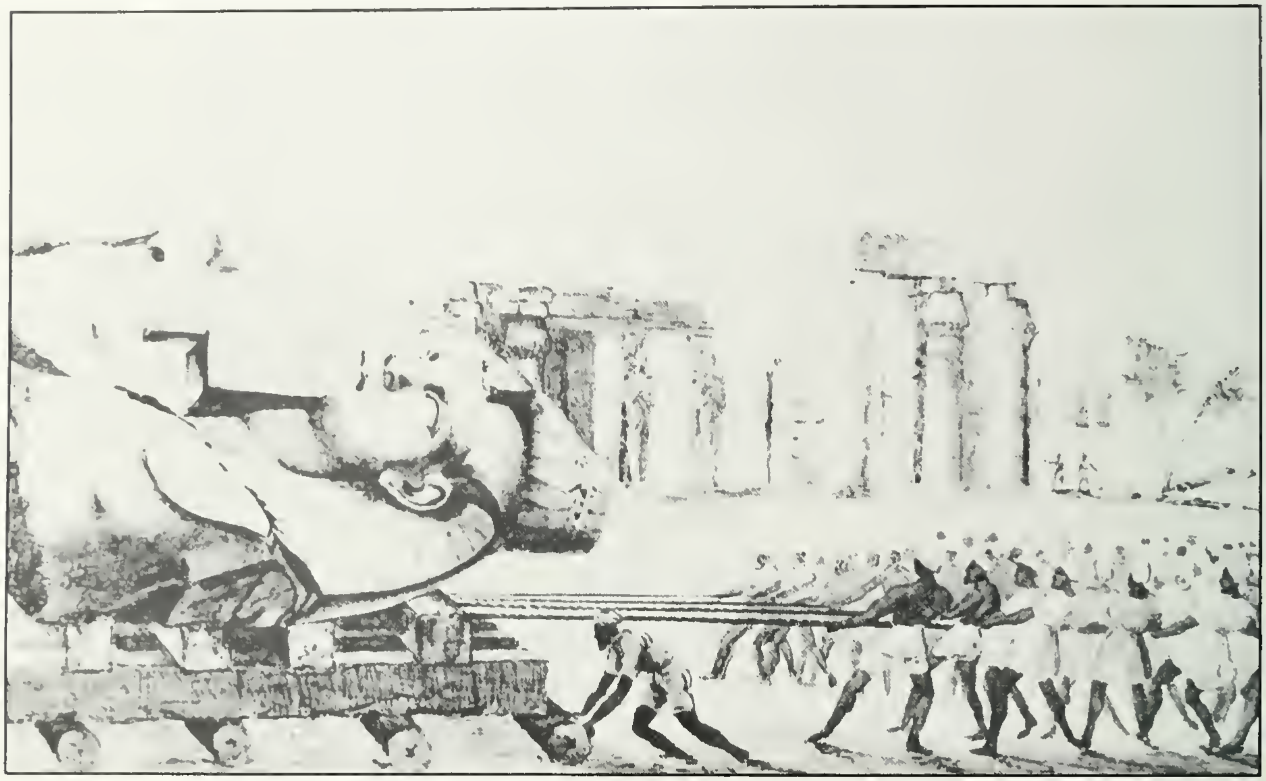
nonetheless, among the most spectacular, and significant, to find their way into the great collections of Europe—notably that of the British Museum.

As a grave robber, Belzoni was hardly unique, for the profession dates back to antiquity and persists, regrettably, today. Belzoni is exceptional, however, in that he admitted—took pride in—his misdeeds, documenting them in a journal, published in 1820: *Narrative of the Operations and Recent Discoveries within the Pyramids, Temples, Tombs, and Excavations, in Egypt and Nubia and a Journey to the Coast of the Red Sea in Search of the Ancient Berenica; and Another to the Coast of the Jupiter Ammon.*

From beginning to end, Belzoni's narrative reads like an adventure yarn, with full accounts of his various trials and tribulations, his failures and triumphs with officials and petty bureaucrats, the military, native workers, and—most of all—with his competitors in the search for antiquities.

Craving notoriety and recognition even more than financial gain, Belzoni was openly candid about his activities in Egypt, confessing that "the purpose of my researches was to rob the Egyptians of their papyri."

Our disapprobation, even disgust, for Belzoni's methods are only slightly mitigated by the knowledge that some of the treasures he purloined would have been forever lost to the destructive processes of development in the Nile Valley. We must bear in mind, too, that in Belzoni's time the collecting of antiquities by any means was *de rigueur,* whether by members of the academic community or by those in the employ of European governments. In fact, the acquisition of archeological materials during the 19th and even into the early 20th century was at times a game of one-upmanship played by private museums, foreign governments, and scholars—with prestige as the big prize. All manner of equipment became standard tools of the trade: gunpowder, battering rams, intrigue, as well as violence of every sort.


*Belzoni removing the head of Ramases II at Thebes.*

Belzoni was born in Padua in 1778. At the age of 16 he went to Rome to study hydraulic engineering—knowledge which he later applied to considerable advantage in the breaking and entering of tombs. In 1803, when he was 25, Belzoni immigrated to England, not as an engineer, but as a strong man on the theater circuit, for he had grown to a height of six and a half feet and was enormously strong. "The Patagonian Samson," as he was billed, toured the stage for nine years, achieving considerable renown, not only as a strongman, but as a mime, a conjuror, and as a designer of fantastic displays.

In 1812, with his wife Sarah (1783-1870), Belzoni set off for Turkey, with the intention of entertaining the sultan; but during a stopover on Malta Belzoni made the acquaintance of an [illegible] Egyptian pasha, who convinced [illegible] his knowledge of hydraulics would be worth a great deal to the Egyptians. Belzoni cancelled plans to entertain the sultan and headed for Egypt.

The pasha was much impressed with Belzoni's proposal for a water-lifting device that would be six times as efficient as the traditional Egyptian contraption. But after nearly a year's work to develop his machine, the scheme fell through; Belzoni was left without a livelihood and without funds.

This state of affairs, was temporary, however. The interest on the part of Europeans in Egyptian antiquities, which had begun with the discovery of the Rosetta Stone in 1799, was coming into vogue. Henry Salt, the British consul in Cairo, was instructed to acquire some antiquities; he, in turn, put Belzoni in charge of the field work.

It was a fascinating—but dirty—enterprise. Tomb-exploring posed particular difficulties for the Italian giant. In his journal he remarked on some of these:

*Many persons could not withstand the suffocating air, which causes fainting. A vast quantity of dust rises, so fine that it enters the throat and nostrils, and chokes the nose and mouth to such a degree that it requires great power of lungs to resist it and the strong effluvia of the mummies. . . .In some places there is not more than a vacancy of a foot left, which you must contrive to pass through in a creeping posture. . . .After getting through these passages, some of them two or three hundred yards long, you generally find a more commodious place. . .but what a place! Surrounded by bodies, by heaps of mummies in all directions. . . .I sought a resting place, found one and contrived to sit; but when my weight bore on the body of an Egyptian, it crushed like a hat box. I naturally had recourse to my hands to sustain my weight, but they found no* *better support; so that I sunk altogether among the broken mummies, with a crash of bones, rags, and wooden cases.*

In June, 1816, Belzoni—armed with a digging permit from the pasha himself—sailed up the Nile to Luxor to examine the colossal stone head of Rameses II. It was indeed a collectible—but the immensitude of the piece!

There were no materials or equipment immediately at hand for the job, and the annual flooding of the Nile—on which the head had to be rafted—was only weeks away. Furthermore, it was nearly the time of Ramadan, the month of fasting when strenuous work by Muslim laborers would be particularly difficult. Then there were to be problems with the officials in charge of the work force. These officials had already been employed by the French consul in Cairo, Bernardino Drovetti, destined to become Belzoni's archrival in the collecting of antiquities. The corruptible officials were to play both ends against the middle, hoping not only for payment from Belzoni, but for extra *bakshish* and other rewards from the French consul for whatever work slowdowns they could bring about.

Not to be discouraged, Belzoni had a platform of palm logs constructed and the gigantic head was levered onto it. Sheer manpower then coaxed the ponderous load toward the river on rollers, also of palm wood. Two ancient columns, which stood in the way of the platform, were smashed aside.

After seventeen days of entreaty, exhaustion, and frustration, the head of Rameses II was finally brought to the water's edge. By November, five months after Belzoni's arrival at Luxor, the giant piece was on its way to the British Museum.

Although the pasha granted separate digging rights to the English and the French, the bitter rivalry between Belzoni and Drovetti continued. At one point an agent of Drovetti threatened to cut Belzoni's throat if he did not cease competing with the French consul.

Belzoni again ran afoul of Drovetti's agents on the island of Philae, where Belzoni had assembled a group of sixteen carved blocks from a temple. Since the blocks were too large to be floated on the Nile, he left orders for them to be trimmed down. Upon returning to Philae, two month later, Belzoni found that the blocks had been defaced by vandals; on one was freshly inscribed: *"Operation Manquee."*

During Belzoni's second journey up the Nile, in 1817, he excavated the great temple of Rameses II at Abu Simbel, discovered six royal tombs in the Valley of the Kings, opened the pyramid of Khafre, and found the lost Roman city of Berenice.

*Belzoni in Arab dress*

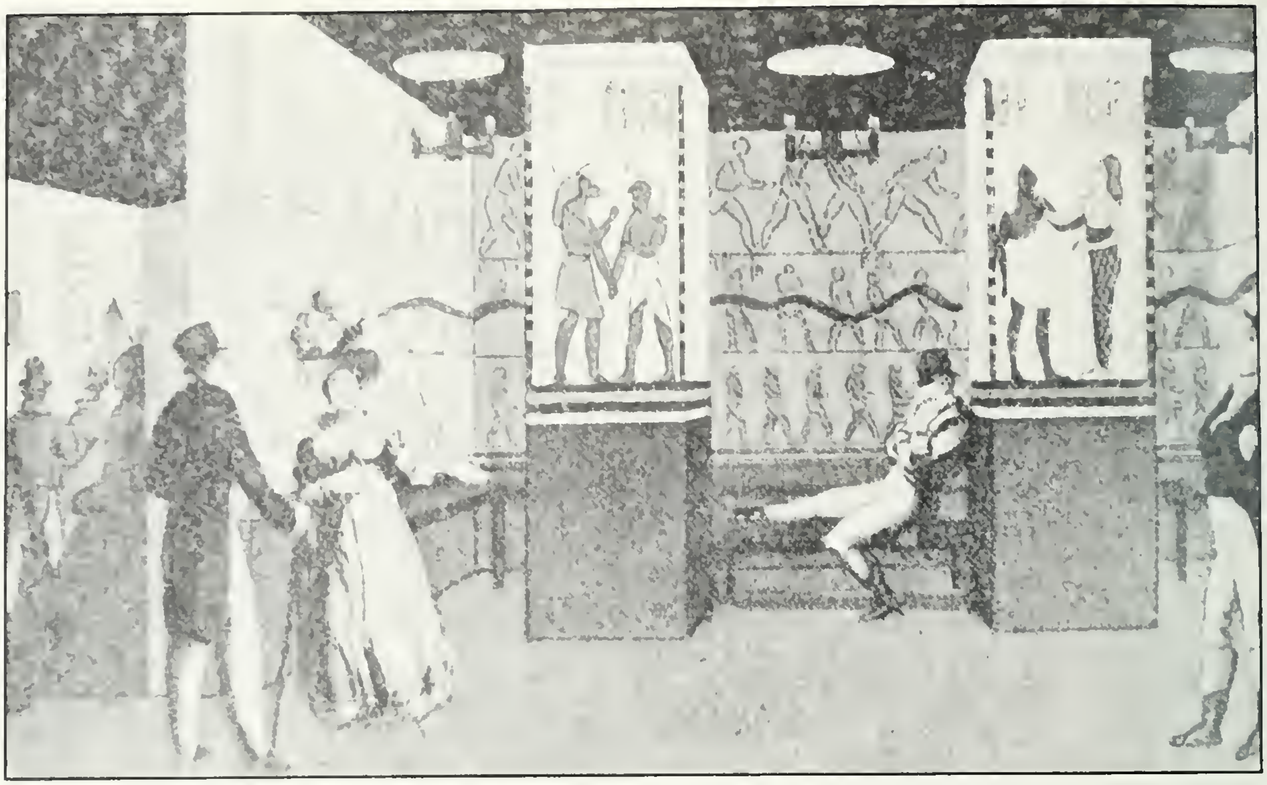
During this period, word of his accomplishments had been spreading, but it was Henry Salt who received the acclaim in Europe and the financial rewards. For Belzoni this was intolerable. At his insistence, the two men drew up a formal contract: Belzoni was to work "under the auspices" of Salt and be properly compensated for his endeavors. But the contract was full of loopholes, and in the end it was still Henry Salt who reaped the greater benefits.

Shortly before Belzoni's three years in Egypt drew to a close, Drovetti, the intransigent Egyptians, and the unfavorable elements of nature all seemed to conspire against him in his experience with a twenty-two foot stone obelisk.

Though Belzoni had laid formal claim to the obelisk in the name of the British consul, Drovetti attempted to make off with it while Belzoni was away. A dispute about ownership of the obelisk ensued, a situation that was simply resolved by Belzoni's presenting a fine gold watch to one of the local functionaries.

With the aid of rollers and levers, the obelisk and its inscribed base were successfully moved from its original site to the banks of the Nile. A jetty for loading the obelisk to a boat was constructed and the obelisk eased onto it. But the flimsy jetty collapsed, and the obelisk, noted Belzoni, "majestically descended into the river." He remained in a state of shock for some minutes, he wrote, standing "stiff as a post." A great deal was at stake: the loss of a priceless work of antiquity in which a considerable sum had already been invested, plus—most important of all—Belzoni's reputation.

*Egyptian Hall at Piccadilly*



But in a matter of days Belzoni and crew succeeded in raising the giant relic. By means of a bridge of palm logs, which had served in the transport of Rameses II's head, they loaded the obelisk onto a boat without incident.

It was Drovetti's machinations, it seems, that finally drove Belzoni and his wife from Egypt in September, 1819: "We embarked, thank God! for Europe: not that I disliked the country I was in, for, on the contrary, I have reason to be grateful; nor do I complain of the Turks or Arabs in general, but of some Europeans who are in that country, whose conduct and mode of thinking are a disgrace to human nature."

He returned to a London that was in love with him; he was toasted everywhere and welcomed in every salon. Moving among the rich and powerful, he received the attention he had so long coveted.

At the Egyptian Hall, on Piccadilly Square, Belzoni exhibited his "curious remains of antiquity." Belzoni, the explorer, the adventurer, himself was now a near-legendary figure. "The Starving mountebank became one of the most illustrious men in Europe," remarked Charles Dickens, "an encouraging example to those, who have not only sound heads to project, but stout hearts to execute."

Belzoni's financial affairs, meanwhile, were in a state of crisis; the British museums would pay too little for the antiquities he had labored so long to bring back. In 1823, Belzoni left the London salons for another exotic adventure, this time lured by tales of the fabled city of Timbuktu and driven by a fierce desire to find the source of the Niger River.

Arriving on the Portuguese coast of Africa early in November, he began his upriver journey, reaching Benin four days later. No sooner had he arrived, however, than the 45-year-old former strong man fell victim to tropical fever. In a week he was dead.

What did Giovanni Belzoni accomplish? Howard Carter, famed discoverer of the tomb of Tutankhamun, saw in Belzoni "the most remarkable man in the whole history of Egyptology." A British historian has seen fit to credit the Italian with laying the foundation of Egyptian Egyptology.

Belzoni was a man of his age—pompous, colorful, romantic, but he was also an example of the kind of rash irresponsibility that long plagued archeology. His indifference to scholarship, his disregard for scientific procedure, his spirit of unflagging self-aggrandizement and need for personal notoriety cast an enduring pall over Egyptology and the entire matter of acquiring antiquities—whatever the purpose.

With the discovery of Tutankhamun's tomb in 1922, a full century after Belzoni's death, the first workable antiquities laws came into being. More recently, UNESCO adopted, in 1970, a convention for prohibiting and preventing the illicit import, export, and transfer of ownership of cultural property; museums, in turn, have established rigorous codes for the acquisition of antiquities. Had these existed in Belzoni's time, it is unlikely that he would have been lured from show business—a profession for which his temperament was eminently suited.

## OUR ENVIRONMENT

*Con't from p. 27*

### Loggerhead Sanctuary Established

Future generations of loggerhead turtles may have a better chance of survival now that the nation's first sea turtle sanctuary has begun along a 20-mile stretch on the North Carolina coast. Regulations governing the sanctuary prohibit commercial fishing inside an F-shaped area that extends as far as three-quarters of a mile into the ocean between Hammocks and Onslow beaches.

The ban lasts from June through August, according to Frank J. Schwartz, professor of zoology at the University of North Carolina at Chapel Hill's Institute of Marine Sciences.

Schwartz says that approximately 85 percent of the female loggerheads that crawl onto North Carolina beaches lay their eggs within that 20-mile stretch. By September, all of the hatching turtles that survive a hazardous sprint to the surf will be in the water headed for the Gulf Stream.

"The sanctuary is an experiment to see if we can improve the chances of the females making it to shore to lay their eggs and the hatchlings making it to the open sea," he says. "It's to give them a little advantage if possible."

Even though sea turtles are protected under the federal Rare and Endangered Species Act of 1978, many drown when caught up accidentally in fishing nets because they can't hold their breath for hours while the nets are being towed.

A typical loggerhead nest contains approximately 120 eggs that resemble ping pong balls. Between 65 and 85 percent of those will eventually hatch on their own, depending on a variety of factors such as temperature and ground humidity. But only one or two of the baby turtles, on the average, will survive the crabs, vultures, and raccoons that feed on them before they reach the water. In unprotected areas, it is not uncommon for the hatchlings to fall into ruts left by beach buggies and to perish in the hot sun. Schwartz and his colleagues have been trying to improve the turtles' survival odds by digging up and incubating some of the eggs. When the baby loggerheads begin feeding on their own, usually after about four days, the scienctists release them into the water.

"How many of those survive predators like sharks, I can't say," says Schwartz. "If we can keep them for a year, I'd be willing to bet that a least half will survive the more than 14 years it takes them to mature."

The large reptiles are more than just a natural heritage that should be passed down intact to future generations, he says. They also help man by keeping down the jellyfish population.

"Jellyfish seem to be one of their favorite foods," he notes. "You can put a hatchling that has never seen a jellyfish before in a pool with one, and he'll swim right over and slurp it up."

### Kangaroo Import Ban Lifted

A ban on the commercial importation of the red kangaroo *(Megaleia rufa)*, eastern gray kangaroo *(Macropus giganteus)*, and western gray kangaroo *(Macropus fuliginosus)*, has been lifted by the U.S. Fish and Wildlife Service. According to the service, four Australian states have established that their management programs are effective and that commercial importation of kangaroos, and their parts or products, will not be detrimental to the species.

The importation ban had been in effect since December 30, 1974, when these species were listed as threatened. At that time the service stated that it would require a certificate from the Australian Government ensuring that a state had developed an effective sustained-yield management program, and that taking would not be detrimental to the species, before allowing commercial importation of any such wildlife originating from that state.

Although kangaroo populations appear to be abundant now, the service maintains that a threatened classification is still warranted. Previously, all three of these species seem to have been overexploited, a condition which could conceivably occur again. Also, it is not unusual for all three species to experience periods of great abundance followed by periods of relative scarcity. In addition, none of these species are protected under any international trade control. These factors led the service to continue its threatened listing of these kangaroos.

The Australian states in question (Queensland, New South Wales, South Australia, and Western Australia) have all complied with the service requirements. To coordinate the management programs of these four states, the Australian National Parks and Wildlife Service reviews all recommendations for harvest quotas from each state.

Current kangaroo population estimates for these states are: Queensland 25,000,000; South Australia 1,400,000; New South Wales, 5,000,000; Western Australia, 1,125,000. These figures are based only on the adult population and only include numbers in commercial zones, in states which make such a designation. Therefore, the service considers a total population estimate of 32 million to be very conservative. Australia established the nationwide kill quota for 1980 at 2.8 million kangaroos.

The proposal to lift this ban, which was published on June 16, 1980, drew a lot of opposition from conservation groups and private individuals. One of the major legal points of the opposition was that allowing commercial importation was contrary to the protection granted to a threatened species under the Endangered Species Act of 1973, as amended.

In its final ruling to lift the ban on commercial importation of kangaroos, and their parts and products, the service responded that these kangaroos represent an unusual case where a species may at some time in the future be vulnerable because of potential threats, yet presently occurs in such numbers as to require control measures. The service is of the opinion that because of the current abundance of kangaroos and the potential indiscriminate use of poisons by ranchers to reduce their numbers, a regulated commercial harvest by licensed private hunters is the most acceptable way to control populations and avoid greater threats posed by other control methods.

After two years, the service will again review the entire situation and determine whether the importation ban should be reimposed. Unless the best available scientific and commercial data at that time suggests otherwise, commercial import of kangaroos, and their parts and products will continue without a requirement for a permit from the United States for individual shipments.

### Pest Resistance to Insecticides

Researchers at the University of Illinois have found that 414 insect pests are resistent to one or more insecticides, and 100 species are resistant to every class of insecticide known.

### Michigan Bottle Ban Results

Michigan, through a petition drive spearheaded by the Michigan United Conservation Clubs, succeeded last year in gaining overwhelming voter approval for a "bottle bill" which created a ban on throwaway containers.

With one year behind them, here are some results:

- Beverage container litter has decreased 84 percent from the previous year.
- All forms of litter are down 41 percent.
- Michigan disposal costs show an estimated saving of $18 million through reduction in solid waste.
- Some 72 million cans and 2 [illegible] of aluminum and steel were re[illegible] the state.
- The aesthetic values [illegible] sured in the greatly improve[illegible] of Michigan landscape

# HONOR ROLL OF DONORS

*Major Contributions in Support of Field Museum's Programs of Research, Education, and Exhibition*

Field Museum of Natural History is deeply grateful to its many donors—individuals, corporations, and foundations—who annually support the work of the Museum. Their gifts help ensure that programs of exhibition and education remain at the levels of excellence that the public has come to expect. Donor support also underlies the work of the Museum's 35 curator-scientists who make original contributions in basic research in the fields of anthropology, botany, geology, and zoology.

We wish to recognize those generous donors who have helped so far in 1981 to meet the current budget. By way of recognition, we place on the Honor Roll of Donors the following who have contributed $1,000 or more during the period January 1 through June 30, 1981, and extend to each our heartfelt thanks.

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# September and October at Field Museum

*September 16 to October 15*

### Continuing Exhibits

HALL OF MINERALS, METEORITES, AND THE MOON. Examine minerals displayed according to systematic classification based on chemical composition and crystal structure. Of special interest are several large crystals from the William J. Chalmers collection. Radioactive and fluorescent minerals are also shown. A selection of meteorites represents Field Museum's collection, one of the world's largest. A 19-foot model of the moon donated to the Museum in 1898 dominates the west end of the hall. Hall 35, second floor.

CULTURES OF THE VAST PACIFIC (POLYNESIA AND MICRONESIA). Start at the large mural map which shows the various cultural areas of the Pacific. Polynesia covers a triangular area extending from Easter Island to Hawaii to New Zealand. Explore the Samoan artifacts in conjunction with the special screening of "Moana of the South Seas" during the 4th Annual Festival of Anthropology on Film (Sept. 26-27). From the Hawaiian Islands see the display of feather objects, including a cape given to England's King George IV by King Kamehameha II in 1824. From New Zealand there is a collection of intricately carved wooden boxes used to store the feathers from the now extinct Huia bird. Hall F. Ground Floor.

### New Programs

FOURTH ANNUAL FESTIVAL OF ANTHROPOLOGY ON FILM. Come experience the cultures of the world in one weekend! Fifty-one fascinating films range from the classic silent documentaries of Robert Flaherty to the coverage of topics on the fringes of anthropology. Highlights of the festival will be a special screening of the new sound version of Flaherty's "Moana of the South Seas" and the keynote speech of Monica Flaherty Frassetto, who has added the sound to her father's silent masterpiece. Order your tickets in advance from the Education Department, or purchase them at the West Door on the days of the festival. Saturday and Sunday, September 26 and 27, 10:30 a.m.-5 p.m. (both days). Tickets: one day: Members $6, nonmembers $7; both days; Members $10, nonmembers $12. For film schedules see pp. 18-20.

WEEKEND DISCOVERY PROGRAMS. On Saturdays and Sundays between 11 a.m. and 3 p.m. you can participate in a variety of free tours, demonstrations, and films on natural history topics. Check the Weekend Sheet at the Museum entrances for location and additional programs.

☐ Saturday, Sept. 19. "The World of Dinosaurs" tour, 2 p.m.

☐ Sunday, Sept. 20: "Clay Dinosaurs" craft project, 11 a.m.

☐ Saturday, Sept. 26: "Ancient Egypt" tour, 11:30 a.m.

☐ Sunday, Sept. 27: "Fireballs and Shooting Stars: Keys to the Universe" tour, 1:30 p.m.

☐ Saturday, Oct. 3: "American Indian Dress" tour, 11:30 a.m.

☐ Saturday, Oct. 3: "Dangerous Animals" tour, 1:30 p.m.

☐ Saturday Oct. 3: "Chinese Ceramic Traditions" tour, 2 p.m.

☐ Sunday Oct. 4: "Prehistoric People in the Illinois Valley" tour, 1:30 p.m.

☐ Saturday Oct. 10: "Bighorn"—Magnificent Mammals series film, 1 p.m.

☐ Sunday, Oct. 11: Highlight Tour—"Spotlight on Animals" tour, 1:30 p.m.

*Continued on back cover*

### Horicon Marsh-Kettle Moraine Birdwatching and Geological Field Trip

### October 17-18

Horicon Marsh is a birdwatcher's delight. Located fifty miles northwest of Milwaukee, it is a refuge that is visited annually by more than a million migratory waterfowl. This overnight field trip will leave Field Museum by bus early Saturday morning, October 17, for Horicon Marsh and return the next day.

Saturday will be spent at the marsh, under the leadership of Peter W. Bergstrom, University of Chicago Ph.D. candidate whose research has centered on the Canada goose. Saturday night we will be accommodated at a motel in the Kettle Moraine area, 35 miles from Horicon. Sunday, under the leadership of Dr. Edward Olsen, curator of mineralogy, we will view the area's well-preserved glacial features that remain from the Great Ice Age which ended 10,000 years ago.

Cost of the tour, per person (double occupancy), is $130.00. For reservations or additional information please write or call the Tours Office 322-8862.

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# September and October at Field Museum

*Continued from inside back cover*

RAY A. KROC ENVIRONMENTAL FIELD TRIPS. You can take a one-day field trip with a knowledgeable leader to a local area of biological and ecological interest. These trips are offered each weekend in September and October. Details are available in pamphlet mailed to all members. Early registration by mail is strongly advised.

COURSES FOR ADULTS. Enroll now for courses beginning October 12. From the largest selection of courses ever offered in this program, you may choose to learn about such subjects as Mazon Creek fossils, Chinese alchemy, Egyptology, or urban insects. The Learning Museum course is "Rugs of the Orient: Threads of Time," which surveys Oriental Rugs and the cultures which produced them. All courses are noncredit, and require advance registration. Phone reservations by VISA/MASTERCARD are accepted. Call 322-8854.

## 4th Annual Festival of Anthropology on Film

OVER 50 FILMS

**September 26, 27**

***see pages 17-20***

FALL JOURNEY: "LOOKING AND SEEING." Field Museum dioramas present a glimpse of a habitat frozen in time. With this self-guided tour you can examine the main themes of several dioramas as well as discover some half-hidden surprises in the detailed backgrounds. Free *Journey* pamphlets available at Museum entrances.

EDWAR[illegible] LECTURE SERIES. Explore distant [illegible] every Saturday during October and November at 2:30 p.m. in the James Simpson Theatre. Narrated by the filmmakers themselves, these free 90-minute film/lectures are recommended for adults. Admission is through the West Door; Members receive priority seating. Oct. 3: "Once upon a Royal River," with Howard and Lucia Meyers. October 10: "Quebec, Whales, and Labrador Tales," with Tom Sterling.

### Continuing Programs

VOLUNTEER OPPORTUNITIES. Individuals with an interest in working with school groups, presenting tours, and participating in other educational programs are asked to contact the Volunteer Coordinator at 922-9410, ext. 360.

SEPTEMBER AND OCTOBER HOURS. The Museum opens daily at 9 a.m. and closes at 5 p.m. every day except Friday. On Fridays the Museum remains open until 9 p.m. throughout the year.

THE MUSEUM LIBRARY is open weekdays from 9 a.m. to 4 p.m. Obtain a pass at the reception desk, main floor.

MUSEUM TELEPHONE: (312) 922-9410.

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# FIELD MUSEUM OF NATURAL HISTORY BULLETIN

NATURAL HISTORY SURVEY
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October 1981

**Field Museum of Natural History Bulletin**

Published by
**Field Museum of Natural History**
Founded 1893

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*Director:* Lorin I. Nevling, Jr.

*Editor Designer:* David M. Walsten
*Calendar:* Mary Cassai
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*Bearberry and juniper on South Manitou Island, Lake Michigan. Photo by Bob Brudd, Tinley Park, Illinois.*

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# FIELD BRIEFS

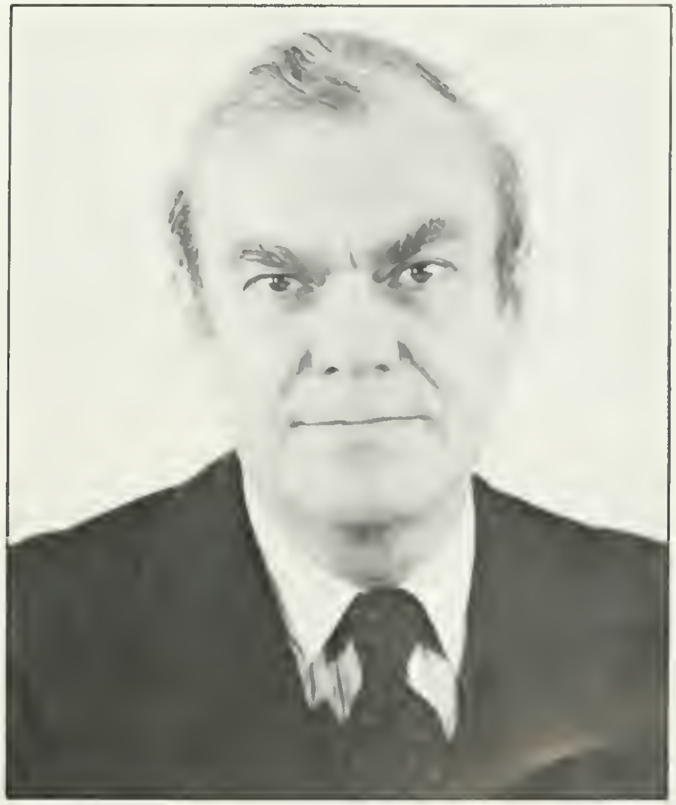
### E. Leland Webber Honored

August 31, 1981, was E. Leland Webber's final day as president of Field Museum, before being succeeded in that office by Willard L. Boyd. In recognition of Webber's more than 31 years' service to the Museum, the staff held a reception in his honor in Stanley Field Hall on the evening of August 27. Master of ceremonies was Lorin I. Nevling, Jr., director of Field Museum, who presented gifts on behalf of the staff to Webber and delivered the following address:

"Tonight we are here to celebrate a Museum career. It is not the usual career, because Lee Webber's influence on the Field Museum has been the greatest since Stanley Field. Only a few of us have been here throughout this period, and therefore, I would like to review some of the highlights with you.

"Lee came to the Museum in 1950. Prior to that he had received a bachelor of business administration degree from the University of Cincinnati, spent three years in the United States Navy, received his C.P.A., and worked for several years with the firm of Ernst and Ernst. In 1951 he was appointed executive assistant to the director at Field Museum; he became assistant director in 1960 and director in 1962. In 1976 he also was appointed president and held this position as well as the directorship until 1980. Those are the bare bone statistics which one usually finds in a professional resume.

"During this period Lee was also active on behalf of the Museum community, engaging in such outside activities as: member of the Board of Governors of State Colleges and Universities of Illinois and of the Illinois State Museum Board, founding member of the Association of Systematics Collections, member of the Joint Committee on Museums for the Indo-U.S. Subcommission on Education and Culture, active participant in the American Association of Museums, and, notably, chairman of the Committee which prepared the Belmont Report on Museum needs. He has served the National Endowment for the Arts as a member of the Council and as a member of the Museum Advisory Panel; most recently he has been a member of the Board of the Institute of Museum Services. All of these efforts have been directed toward strengthening museums and museum activities, whether in education, exhibition, or research. All of these organizations, as well as Field Museum, have been greatly strengthened by his participation.



*E. Leland Webber*

"Following the death in 1964 of Stanley Field, who had headed the Museum for more than half a century, it was clear that a modernization program was called for. The time since 1965 can be divided roughly into three distinct periods. The period 1965 through 1969 can be characterized as one of internal reorganization—a period in which the institution looked at itself in terms of its services to the community, its own needs, and the way in which those needs might be met financially. Lee introduced long-range planning and the Museum began to be run in a more businesslike fashion. In retrospect, this was an extraordinary breakthrough, for many of America's leading cultural institutions still must go through this necessary evolutionary step.

"Nineteen seventy through 1974 was the period when we began to put our house in order physically. The key was the bond issue through the Chicago Park District in which Lee played an absolutely critical role. I wonder how many thought at the beginning of this program that it would be possible to raise the $12.5 million of matching money required to take full advantage of the bond issue. Work was begun and virtually every segment of the institution was affected. In spite of fears, the negative impacts were minimal, and by and large the institution functioned at a normal pace. At the same time, the Board of Trustees was reorganized in order to become more effective. This reorganization led to the formation of a number of continuing active committees on which many staff members have served.

"The period 1975 through the present can be characterized as one in which the pace of public programming dramatically increased. There were a number of important events during this time including the initiation of the Adult Education classes, and receipt of the Learning Museum grant. But the outstanding event was unquestionably the special exhibit "The Treasures of Tutankhamun." Tut signalled a new era for us, for it initiated a new plateau of activity in all segments of the institution and that spirit remains with us today.

"Another less visible contribution which Lee has made involves the caring relationships which he has nurtured, often over a period of many years, with individuals outside of the Field Museum family. Infused by his spirit and limitless enthusiasm, these individuals have become major supporters.

"We are where we are today because of all of you and because of the leadership of Lee Webber. On behalf of all of us thank you, Lee, for a job well done."

## Field Museum Tours

*For information on Field Museum's exciting tours to Baja California, Alaska, the Bahamas, the Galapagos and Ecuador, Kenya, Australia, and India, [illegible] 24-25*

*Learning Museum continues with:*

# Rugs of the Orient
# *Threads of Time*

*by* ANTHONY PFEIFFER
*Project Coordinator*

Made possible by a grant from the National Endowment for the Humanities, a federal agency

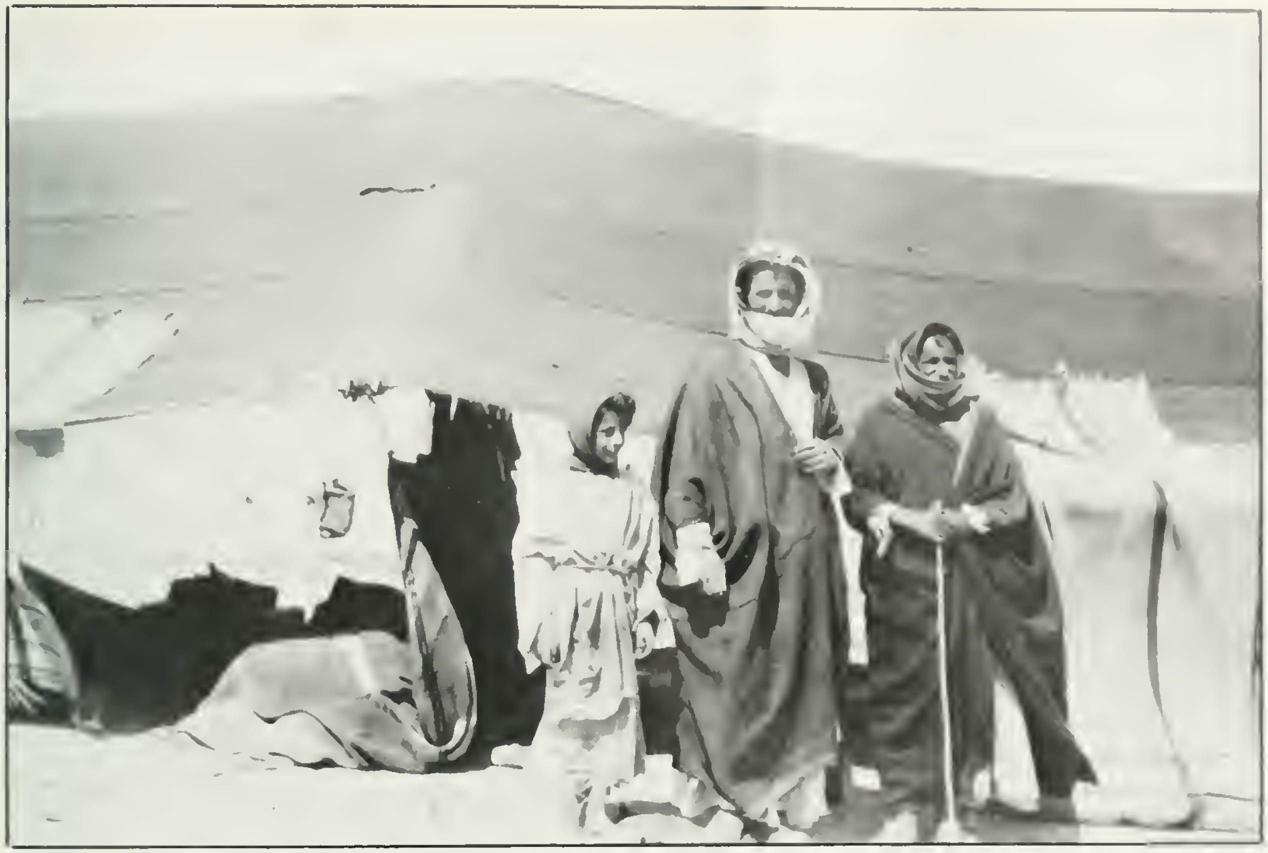
Flying carpets are used for transport to strange and exotic places in *The Arabian Nights*, a collection of ancient tales from Arabia, Persia, and India (A.D. 900). Although magic carpets may never have existed except in fable and in the imagination, Oriental rugs are known all over the world for their beauty and craftsmanship. They are made throughout the Middle East, in Central Asia, India, and China.

Rug-making origins are buried in the distant and unknowable past. Rug materials are more perishable than are those of the other design arts such as painting, sculpture, and architecture. The oldest surviving rug was discovered in a burial mound in 1947, preserved in perpetual ice on the U.S.S.R.-Mongolian border. The piece, known as the Pazyryk, after the valley in which it was found, was probably made in Persia. The Pazyryk showed that the art of knotting pile rugs had already been mastered in the fifth century B.C.

Nearly 2,000 years separate the Pazyryk from the next oldest rugs to have been preserved. These are in the Museum of Islamic Art, Istanbul, and date from the thirteenth century. Asia Minor was at that time, if not the only carpet producer, at least the largest one. Two centuries later Marco Polo described the rugs of Asia Minor as "the best and handsomest carpets in the world."

The prehistory of rug-making peoples is almost as obscure as the origin of rug manufacture itself. The Middle East has always been viewed by the West as a nomadic backwater, an area distinguished only as a crossroads between important centers of civilization. Funded by petrodollars and inspired by emerging national pride, however, recent archeological expeditions in Saudi Arabia have unearthed 7,000-year-old village complexes. Such findings indicate large, settled populations and may suggest

*Hundreds of h*
*labor over s*
*looms produce t*
*diversity and quality*
*of textiles for whi*
*the Middle East i*
*known. Circa 1927, in*
*Afghanistan.*



*Desert encampment in Transjordan. Two of the many functions of rugs are illustrated in this 1928 photo. Rugs draped over the tent provide shade within the structure; they can be easily moved as the sun shifts. A rug suspended from a rope inside the tent serves as a room divider.*

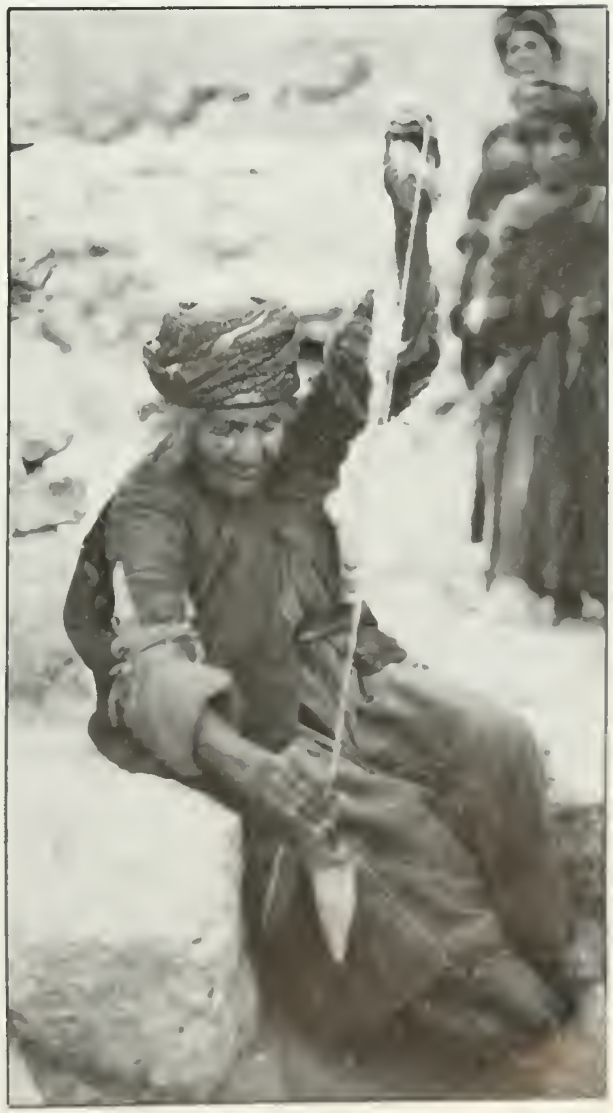
an ancient tradition to the art of rug manufacture.

The famous carpets of historical times undoubtedly required a settled and stable environment for their production. The Ardebil carpet, of Persia, was completed in 1531, after four or five people had worked on it for 30 years. An extraordinary amount of effort went into making even less spectacular rugs. Consider, for example, this old Indian recipe for a rich red dye:

*Take lac color and cochineal. Steep from four to six days in the sun, in hot weather for the lesser period, stirring constantly, , till a rich deep color comes where some has stood for a few minutes in a thin glass bottle and settled. Then strain through two cloths, and put in pomegranate rind and good iron-filings water. Add mineral acid, steep the wool for 36 hours, then boil for 3 hours, wash well and dry.*

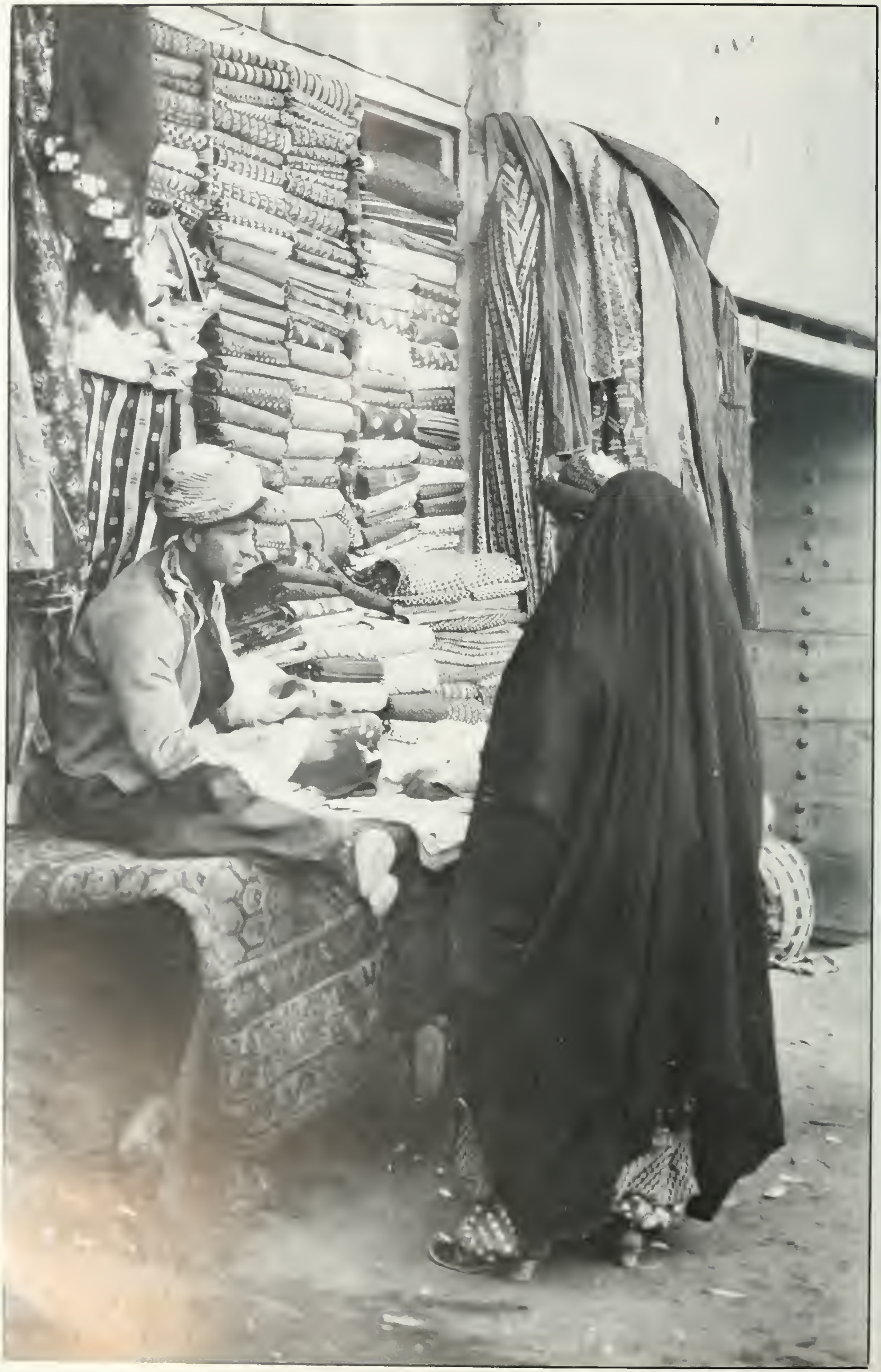
**NEH Learning Museum at Field Museum**

*The NEH Learning Museum program is a three-year sequence of learning opportunities focused on the Museum's outstanding exhibits and collections and designed to give participants an opportunity to explore a subject in depth. Each unit of study consists of one or more special events, a lecture course, and a seminar for advanced work. Special events are lectures by renowned authorities or interpretive performances and demonstrations. Course members receive an annotated bibliography, a specially developed guide to pertinent Museum exhibits, and study notes for related special events. In-depth, small group seminars allow more direct contact with faculty and with Museum collections.*



*A woman spins wool in Al Qosh, Afghanistan, circa 1928*

*Many bolts of cloth are available at market. The vendor, seated on a rug which is probably from Persia, bargains with a potential customer. Circa 1928.*



All this labor produced merely one of the colors needed for a carpet. Multiply all the work by 12 or even 15 and you have an idea of what it took to produce masterpieces.

Rugs such as the Ardebil and other famous examples of the craft were made for royalty. The common people made and used simpler rugs, as they do today, for a startling variety of purposes. Carpets are used as beds, wall hangings, for shade, to sit on, and to divide rooms. Special rugs are used for prayer and may be patterned after the ground plans of mosques. Some may be made simply because woven wool brings more money than raw wool.

*Rugs of The Orient: Threads of Time* invites you to survey the full range of Oriental rugs — from the ornate rugs of princes to the functional weavings of desert nomads. The many types of rugs and their uses, along with manufacture methods and materials are considered. Places and times of production are also discussed. Explore the symbols on carpets in terms of their practical, cultural, mystical, or artistic significance. Fabulous rugs of the court, commercial rugs made to cater to western tastes, and the everyday rugs of village life are examined. Lectures feature leading authorities on Oriental rugs from all over the United States. The course of study begins October 14, and details are available in the Fall, 1981, *Courses for Adults* brochure.

A colorful gentleman bedecked in and carrying all manner of ornate textiles. Circa 1928

You are also invited to attend *Fabric of Culture Festival*, a related special event, on November 15, 1981. As the photos here show, rugs are simply one kind of splendid textile produced in the East. *Fabric of Culture Festival* celebrates many types of textiles, the fine art with which they are made, and the diverse peoples who use them. A full day of activities includes spinning, weaving, dyeing, knitting, and many other demonstrations. Experts are on hand to comment on and evaluate your textiles. Turkish folk singing and films of the Middle East and its people are highlighted. Details are announced in the *November Calendar of Events*, sent to Members.

[illegible]

# *Searching for Meteorites*

## The Press Release Strategy

*by* PAUL SIPIERA

*Research Associate, Department of Geology*

Some 4.6 billion years ago Earth and the other planets gradually formed from the cooling, condensing residue that remained after the birth of the Sun. We know this because the embryonic stages of our solar system have been imprinted on the chemistry of minerals present in meteorites and in the general physical appearance of the meteorites themselves.

Since its own formation, Earth has been bombarded by these fragments of rock and metal; and even now, thousands of meteors continue to plunge into the Earth's atmosphere daily. The vast majority, however, burn up before reaching the Earth's surface. Of those that do make it through, most are lost in the oceans. Meteorite finds, correspondingly, are rare; but every one is of interest to science, since each carries unique clues to parts of the great cosmic puzzle of our solar system's origin. They are, in a sense, the poor man's space probe, yielding free information that is otherwise obtainable only by means of costly man-made space vehicles.

How does one go about finding meteorites for scientific study? There are a number of possible approaches. The most productive is to search for them in the Antarctic icecap, where the dark-hued meteorites stand out boldly against the white of the ice. Because of move-

---

*Paul Sipiera is assistant professor of geology and astronomy at William Rainey Harper College.*

*Meteorite sear members use detector to locate in meteorites. Left: Mi Matheson, righ Nancy Caskey, students at William Rainey Harper College.*

ment within this icecap, meteorites which have been accumulating for thousands of years and are buried within the ice, are brought up to the surface, where they await discovery. The main drawback to an Antarctic search is the simple one of economics; few researchers have funds for such a costly venture. The less fortunate—those without the resources to collect so far afield—must wait patiently for the next meteorite to fall—in one's own backyard, so to speak—or await the report of the farmer who plows up an odd-looking rock in his field.

But there is another, more productive approach, one which utilizes the special power of museums and other scientific institutions to educate the public about meteorites. Rarely locating meteorites by themselves, scientists rely almost exclusively on rockhounds and keen-eyed farmers to report their unusual finds.

In April, 1976, the Field Museum in cooperation with William Rainey Harper College, of Palatine, Illinois, inaugurated a program of meteorite recovery, modeling it after a similar, highly successful program conducted by UCLA in 1974. The Field Museum-Harper College approach, like UCLA's, was to distribute a press release to newpapers around the country, offering a $100 reward for the discovery of a previously unreported meteorite.

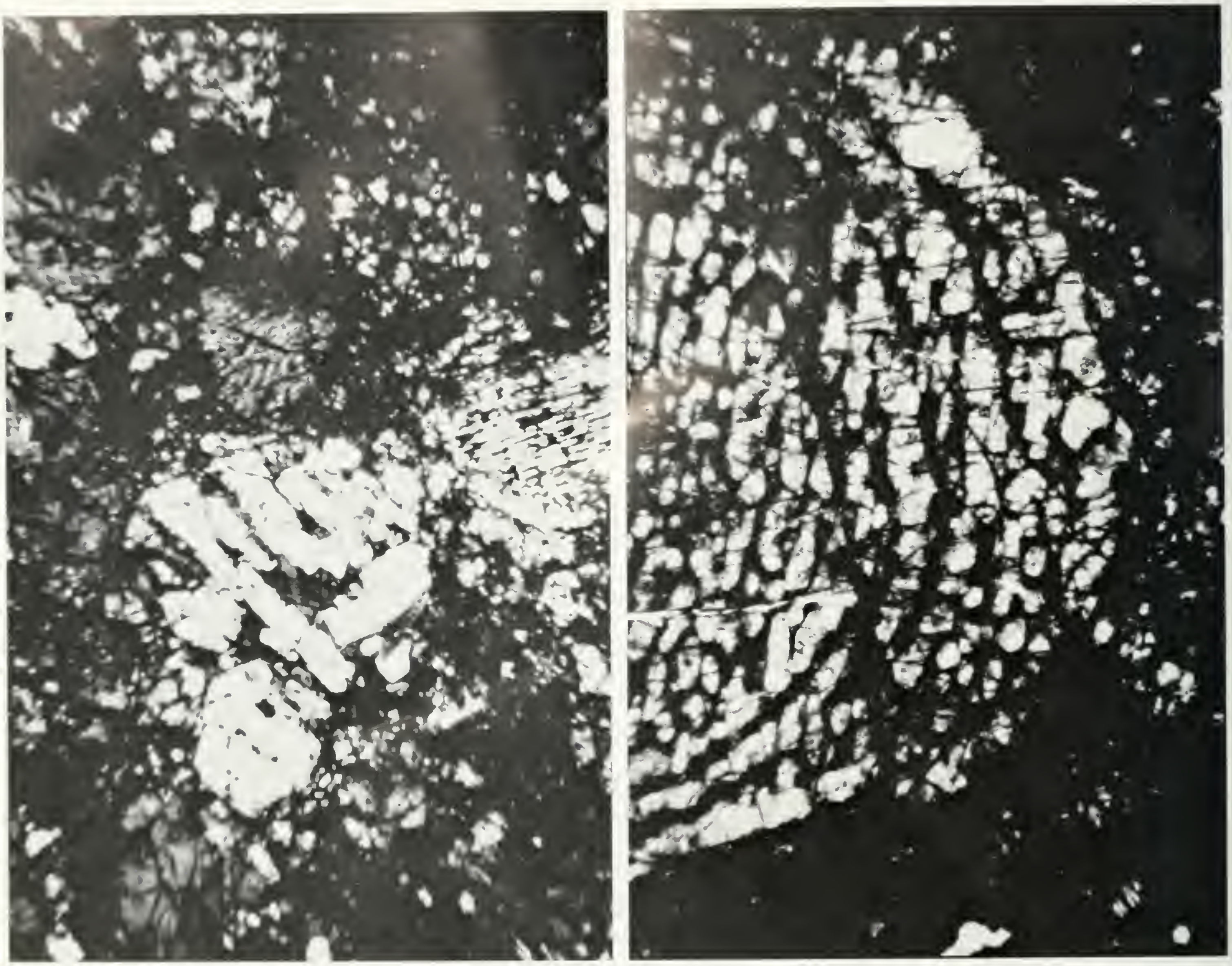
From April 1, 1976, to March 31, 1980, the reward offer resulted in 1,453 inquiries about meteorites. Persons in 44 states and six countries wrote or called in; most responses, as expected, were from Illinois and neighboring states; about half concerned actual specimens for identification. As a result of this effort, only two genuine meteorites were located: a tiny fragment of the Canyon Diablo iron meteorite was brought to the Museum during the first two weeks of the program, and two years later a small fragment of a meteorite that fell in Nakla, Egypt, came in from England. Both meteorites had long been known to us and, in fact, we already had specimens of them in the Field Museum collection. But no new meteorite specimens turned up, so the reward remained uncollected.

Then, in the spring of 1977, we decided to change our tactic, sending search teams to areas where meteorite recovery has historically been good (see "In Search of Meteorites," by Paul Sipiera, in the September, 1977, *Bulletin* ). Search team members canvassed farmers in selected areas, describing to them what meteorites look like. It was during this time that we first heard from Walter E. Hollingsworth, a farmer living in Plainview, Texas, who wrote that he had seen our reward offer in the local newspaper. Hollingsworth had two or three meteorites lying around the house and wondered if we would like to see them.

*Walter E. Hollingsworth (left) receives $100 check for meteorite discovery from the author, who holds the Rock Creek, Texas, meteorite*

After a year of looking at hundreds of "meteor-wrongs," we were by then skeptical of such offers. So we were understandably excited when one of Hollingsworth's specimens turned out to be the real thing; it was a 4.4-lb. stony meteorite he had plowed up almost forty years earlier. On analysis, it was shown to be part of a large, known meteorite shower that had fallen around Plainview about 1900. So Hollingsworth's find, regrettably, failed to qualify for the reward.

In 1980, three years after launching our program, we still had no new meteorites to show for our efforts. Then we heard again from Hollingsworth. He reported that since our 1977 visit he had kept his eye out for meteorites while plowing. This had yielded nothing; but a neighboring farmer had found what seemed like it could be a meteorite in his cotton stripper. Hollingsworth succeeded in obtaining the specimen and mailed it to us. He had a winner! The three-pound, ten-ounce (1,641 gm) object



*Microphotographic views of chondrules in the Rock Creek, Texas, meteorite. Left view shows several chondrules; width of field about 2.5 mm. At right is a large, barred-olivine chondrule with five distinct rims. Chondrule diam. 7 mm.*

was not only a genuine meteorite, it proved to be a *new* find, not part of a previously known shower. So Hollingsworth became the first recipient of the $100 reward. His meteorite has been given the name of Rock Creek, Texas, the town nearest the discovery sight.

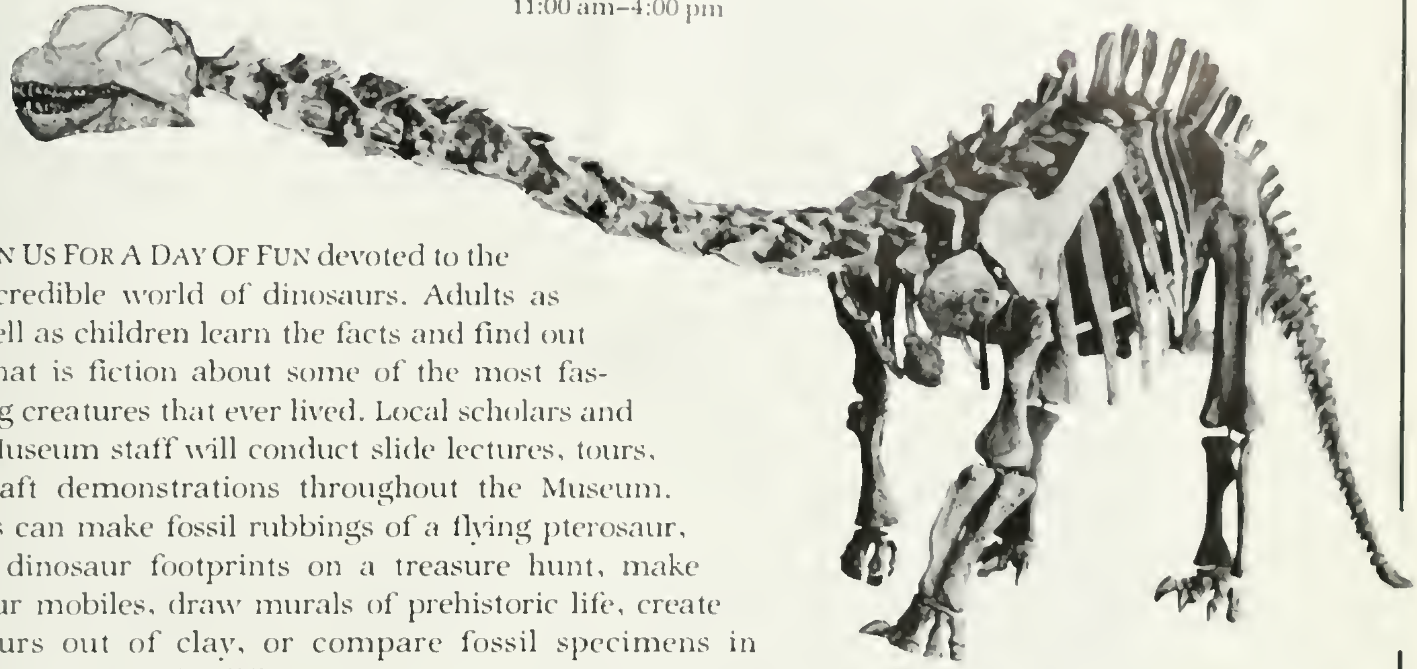
The Rock Creek meteorite is roughly rectangular and its surface is highly oxidized, indicating exposure to Earth's weathering processes over a considerable length of time. Its interior also reveals weathering penetration fractures, small grains of metal, and an abundance of imbedded BB-like structures known as chondrules. In the opinion of experts, these light-hued structures are representative of the first solid objects to condense from the cooling solar nebula billions of years ago. In [illegible] scientists believe they have the best [illegible] of the earliest conditions of the [illegible].

[illegible] meteorite is generally sub- [illegible] tests, including chemical [illegible] content determination; its age may also be calculated. The ratio of metal to rock-forming minerals in the meteorite will classify it as a stony meteorite (80 percent rock, 20 percent metal), a stony-iron meteorite (about half rock, half metal), or an iron meteorite (20 percent or less of rock, 80 percent or more of metal). The Rock Creek meteorite belongs to the stony group, and it is further classified as an "ordinary chondrite." But the specimen is hardly ordinary: Microscopic examination of its interior has revealed a wide variety of chondrules. Among the more interesting of these is a large (7mm diam.) barred-olivine chondrule with as many as five concentric rims, or shells. One rim is typical in barred-olivine chondrules, but five is extraordinary.

We still have a great deal to learn about the processes which formed meteorites and how this information relates to the origin of planets; but this tiny hunk of rock found in a Texas cotton stripper may provide answers to some of these cosmic questions. Walter Hollingsworth, thank you! ☐

# Dinosaur Day

Sunday, November 8, 1981
11:00 am–4:00 pm

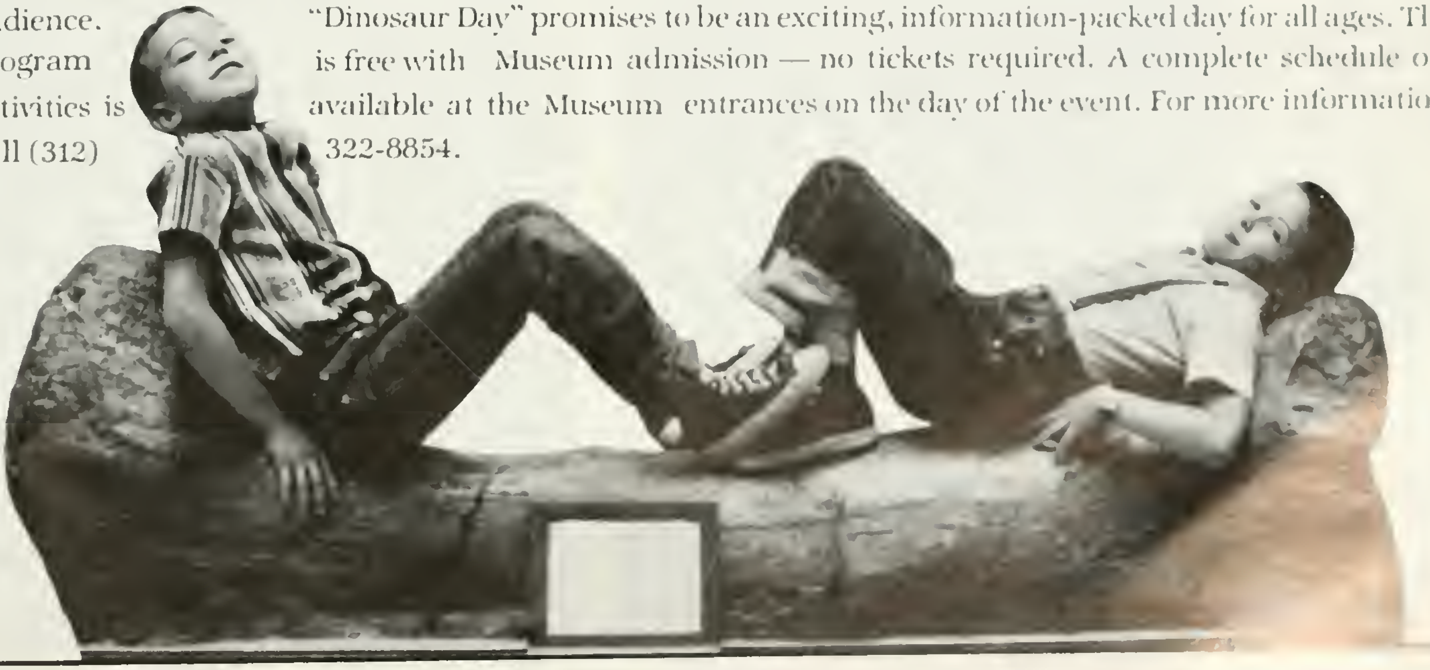


Join Us For A Day Of Fun devoted to the incredible world of dinosaurs. Adults as well as children learn the facts and find out what is fiction about some of the most fascinating creatures that ever lived. Local scholars and Field Museum staff will conduct slide lectures, tours, and craft demonstrations throughout the Museum. Visitors can make fossil rubbings of a flying pterosaur, follow dinosaur footprints on a treasure hunt, make dinosaur mobiles, draw murals of prehistoric life, create dinosaurs out of clay, or compare fossil specimens in "Dinosaur Show and Tell."

Museum staff will demonstrate how dinosaur bones are transported from the field to the lab, and explain reconstruction techniques. Special in-depth tours, slide lectures, and mini-tours will present the story of dinosaurs as shown through Museum exhibits in the Hall of Fossil Vertebrates. Join us for the "Ultrasaurus Story" or learn about paleoinvertebrates—creatures that lived in the ocean long before the dinosaurs arose. Find out about dinosaur behavior and locomotion and learn how they are studied through fossil record.

Special films acquaint you with the various extinction theories, explain how fossil specimens are collected, and show you some of the dinosaurs' closest living relatives.

The films "Hot-Blooded Dinosaurs," "The Asteroid and the Dinosaur," and "Dinosaurs: The Age of Reptiles" will be screened in James Simpson Theatre at the Museum's barrier-free West Entrance. Between films, paleontologists will discuss the various dinosaur extinction theories and invite questions from the audience. "Dinosaur Day" promises to be an exciting, information-packed day for all ages. The program is free with Museum admission — no tickets required. A complete schedule of activities is available at the Museum entrances on the day of the event. For more information call (312) 322-8854.



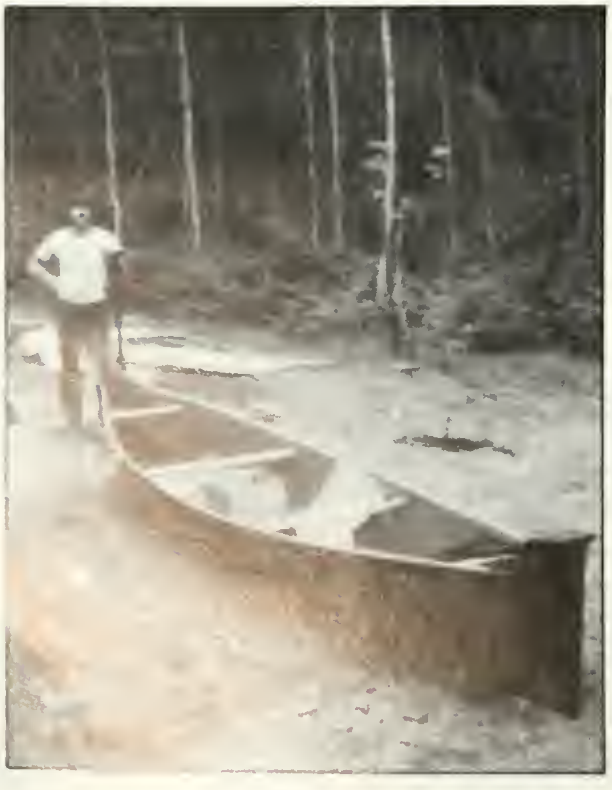
# CANOES
# Of The Maritime Peoples Of The Northwest Coast

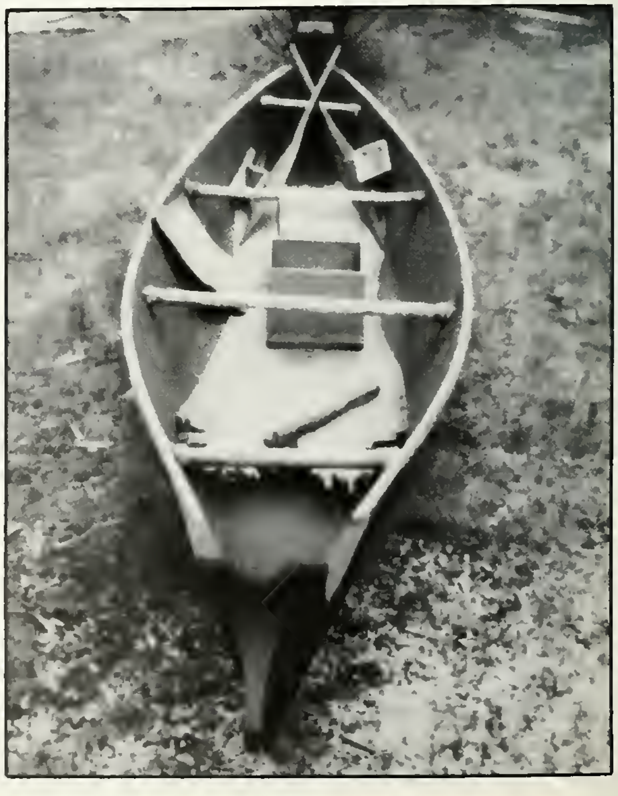
by RONALD L. WEBER
Visiting Assistant Curator
Department of Anthropology

Throughout the Pacific Northwest, Indians built large villages on the seashore or riverbanks, facing the water. Oceans and rivers were not considered barriers; they were, instead, roads of interaction. Many foods and other materials were accessible only by water; but even forest animals, berries, and edible roots were brought back to the village in boats whenever possible. Warriors, traders, hunters of land game, and collectors of forest products—all began their expeditions in canoes. Cargoes too heavy for one man to transport could be carried easily by water over long distances.

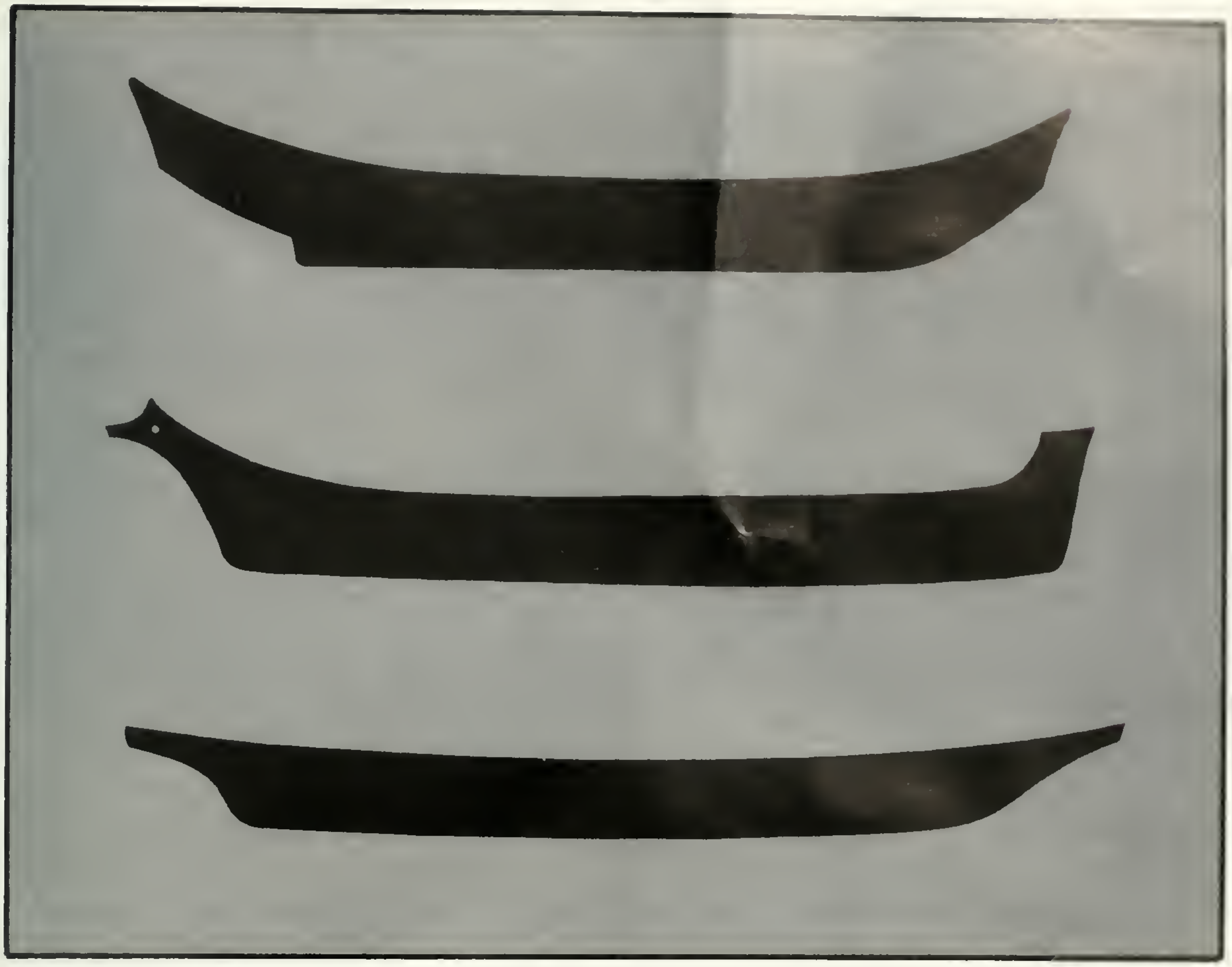
It has been said that an essential factor in the ability of various early peoples to accumulate excess wealth and food was the wheel; but more often, efficient watercraft have carried the truly large loads. It was the efficient dugout canoe that made it possible for the dense populations on the Northwest Coast to gather in costal villages. Abundant food supplies and other status goods could be collected from diverse areas and brought back to the large permanent houses of the winter villages.

Dugout canoes were built of single red cedar logs. These were hollowed out and filled





Sixteen-foot canoe built for Field Museum by Lance Wilkie, a Makah Indian. At left, Wilkie poses with the recently completed canoe. The [illegible] shows in the canoe various articles made by Wilkie and by Margaret Irving, also a Makah, which will be placed in the canoe when it is exhibited at Field Museum. (Photos courtesy Lance Wilkie.)



*Silhouettes of Northwest Coast canoes. From top to bottom: Haida, Nootkan, and river canoe. Models of these will be on view in Hall 10, opening April, 1982.*

with a mixture of water and urine, which was heated by adding hot stones. As the wood became pliable, the sides of the canoe were spread open and held with thwarts. The outer form of the canoe and inside details were then finished. To render the craft more seaworthy, bow and stern pieces were added. The largest canoes—up to 70 feet long and capable of carrying 50 to 60 passengers—were used by warriors, traders, or people on their way to a ceremony at another village. Other types of canoes were designed for whaling, sealing, or for fishing, and each coastal group had its own particular style. Around the Queen Charlotte Islands, which lie just south of the Alaskan panhandle, the Haidas made round-bottomed canoes with high, sweeping bows and sterns. The Nootkan (West Coast People) made flat-bottomed canoes with blunt sterns and sweeping bows; the latter resembled the neck and head of a bird or wolf. Dugout canoes without raised bows or sterns were common among the Salish.

The Field Museum had no full-sized Northwest Coast canoes in its collection when it began developing plans for its new permanent exhibit of the Maritime Peoples of the Arctic and Northwest Coast, scheduled to open in Hall 10 in April, 1982. There were several kayaks which could be used in the Eskimo portion of the exhibit, but it was also essential that a Northwest canoe be included in an exhibit emphasizing the Maritime adaptations.

Last year, to fill this need, Field Museum commissioned Lance Wilkie, a Makah Indian of Neah Bay, Washington, to build a canoe in the Nootkan style—specifically a salmon-fishing canoe, since salmon are the most important food resource of the coast Indians. The seagoing, 16-foot canoe[1], with bird-shaped bow, was successfully tested in the Pacific last April. On view in the salmon fishing section of the new exhibit, it will be equipped with paddles[2], bailers[3], water box[4], salmon club[5], hooks[7], and kelp fishline[7], all made by Lance Wilkie. A canoe mat[8], food bag[9], and fish pouch[10], all made by Margaret Irving, also a Makah Indian, will be placed in the canoe.

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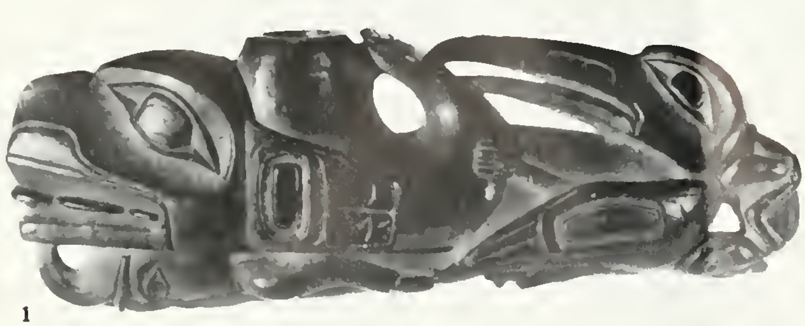
*1. Catalog #264040, 2: #264037, 3: #264038 4: #264042, 5: #264043, 6: #264041, 7: #264044 8: #264045, 9: #264046, 10: #264039*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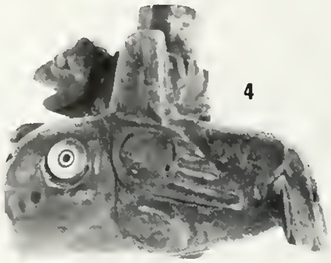
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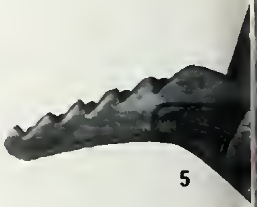
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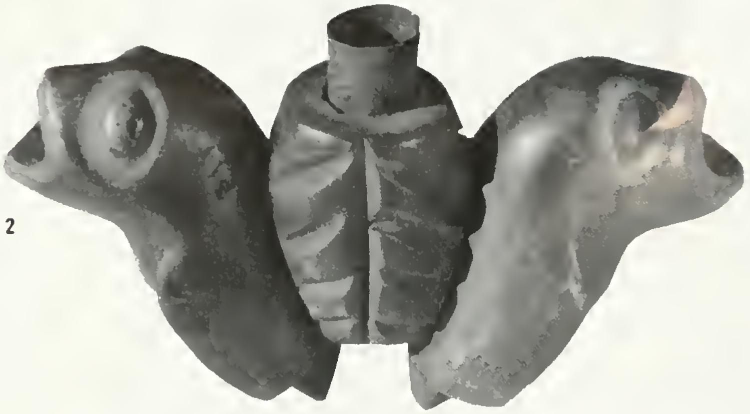
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# Tobacco and Pipe Use Among the

*By Daniel J. Joyce, staff member of the Maritime*

*1: Haida argillite pipe with European and Indian motifs combined. Shown are figures of birds, humans, and a whale; 82673. 2: Tlingit pipe representing two young ravens waiting to be fed. The pipe has two mouth holes, one in each of the ravens' mouths. It has an iron bowl; 78850. 3: Tlingit (Tarku) stone pipe from Stevens passage, Alaska. Totemic figures represent a raven and a raven's head; 78251. 4: Wooden pipe in form of killer whale, with another figure superimposed. The bowl is made from a gun barrel, the eye is a cartridge shell base; 14[illegible]7. 5: Tlingit [illegible] pipe. The pipe [illegible] otter on [illegible] the water holding a [illegible] hind paws. The na[illegible] terpretation is th[illegible] otter represents a ca[illegible]*

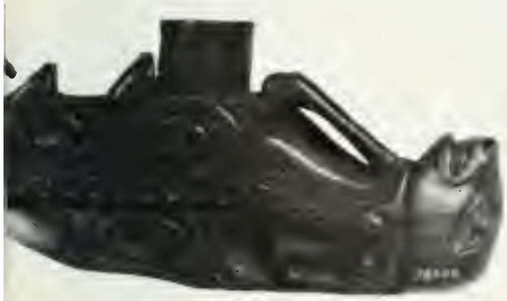
The history of tobacco use and its diffusion throughout the world began when Christopher Columbus's crew members first observed cigar smoking among the natives of what is now Cuba. By 1600 tobacco was being widely cultivated in European countries and in their colonies abroad. Within a short time explorers had also brought the American Indian pipe to Europe. Eighteenth-century colonists introduced tobacco into areas where it had never been cultivated or smoked. The Russians brought it to the Alaskan Eskimos, while the British and French introduced it to most of the Sub Arctic Indians. The tobaccos disseminated in this manner were of two species: *Nicotiana tabacum* and *N. rustica*.

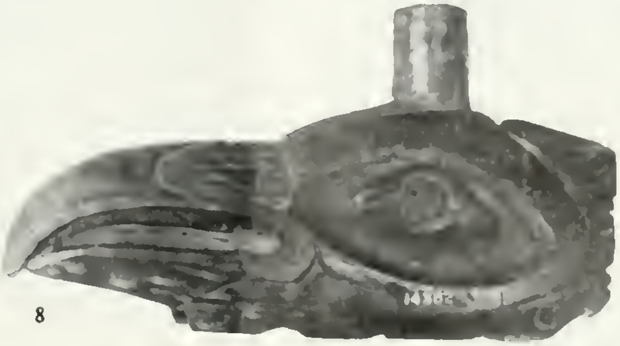
Europeans first came to the Northwest Coast in 1741, when Vitus Bering, a Danish navigator in the employ of the Russians, sought a land bridge between North America and Kamchatka Peninsula, which extends south[illegible]ward from easternmost Siberia.

[illegible] this voyage Bering had two ships, [illegible] separated in a storm, and Bering [illegible] shipwrecked on an island between [illegible] Siberia. His crewmen, however, [illegible] sea otters, and after their [illegible] samples of otter pelts back to Russia. The sleek fur was immediately in demand, and the Northwest coastal area was soon overrun with pelt-seekers from the east and west. The resident Indians, from southern Alaska to southern Oregon, adopted many of the newcomers' ways, including tobacco smoking and the use of pipes.

In prehistoric times, tubular, trumpet-shaped pipes (a style introduced by Indians of the Plateau area to the southeast) were smoked in the vicinity of what is now the city of Vancouver, British Columbia, and to the northeast on the upper Fraser River; but pipes discovered at archeological sites in these areas are few. When the first European arrived, pipe smoking had not been practiced in these areas for some four centuries. The fact that pipes have never been found in prehistoric sites north of Vancouver Island may simply be because until now relatively little archeological investigation has been conducted there.

In prehistoric times, the Tlingit and Haida, north of Vancouver, pulverized tobacco leaves, mixed them with pine bark or shell lime, and made them into pellets, which were dissolved in the mouth. Recent analysis of tobacco collected in 1787 by the English explorer George Dixon has





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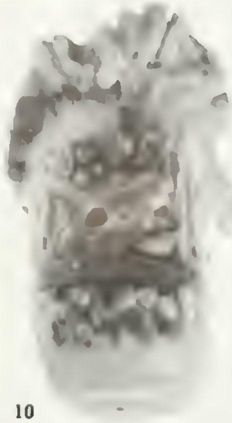

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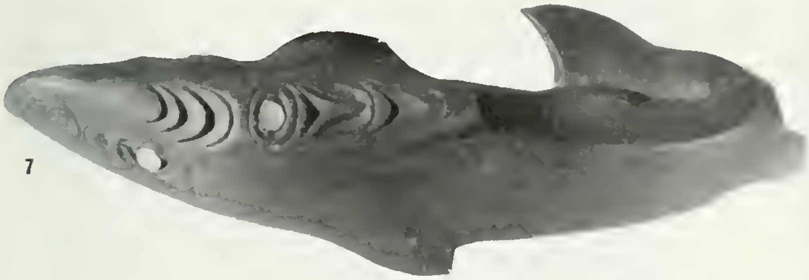

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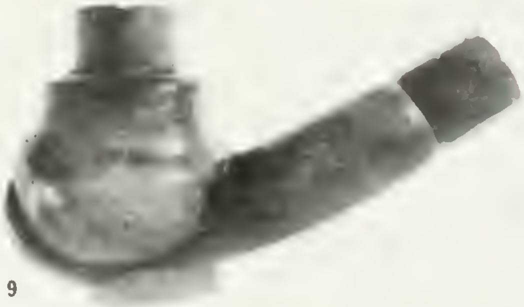

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# Indians of the Northwest Coast

*Peoples of the Arctic and Northwest Coast Project*

shown the tobacco species to be *Nicotiana quadrivalvus*.

Some anthropologists suggest that the chewing of tobacco came to the Northwest Coast Indians from lime-chewing tribes of southern California, Mesoamerica, or even Andean South America. The fact that tobacco was chewed but rarely smoked before the arrival of Whites is also indicated by the journals of Lewis and Clark in the early 1800s.

Each Northwest coast family associated itself with a particular animal or animals, such as the raven, eagle, or beaver, and representations of these are recurrent in the highly developed art style of the region. A great variety of everyday goods were decorated with such motifs, and it was natural that they were also used on the new smoking pipes, such as those shown here.

Northwest Coast pipes are of two basic types, both markedly different from the calumet, or "peace pipe," of the Plains Indians. One type, created by Haida craftsmen of argillite, a carbonaceous shale, was made for trade with Whites, and often had European and Indian motifs in combination. The second type, made by tribes other than the Haida, was of wood, stone, or bone, decorated only with Indian motifs, and used primarily by the Indians themselves. Many of the latter type were inlaid with shell, bone, ivory, or even cartridge shell bases. Some were carved from gunstocks, and gun barrel sections were frequently used as pipe bowl liners.

In contrast to tribal customs elsewhere in the Americas, Northwest Coast pipe smoking was generally not used in religious ceremonies; ritualized smoking, however, became common in certain nonreligious rites.

The Northwest Coast is largely a lush rain forest, which was a bountiful source of food and the other essentials of life. Its residents, then, were involved to a lesser extent with subsistence activities and more with the creation of their various art forms; their art readily incorporated new materials brought in by the Europeans. The acculturation of the Northwest Coast Indian is exemplified by their quick adoption of pipe smoking and the application of their art form to the smoking pipes shown here.

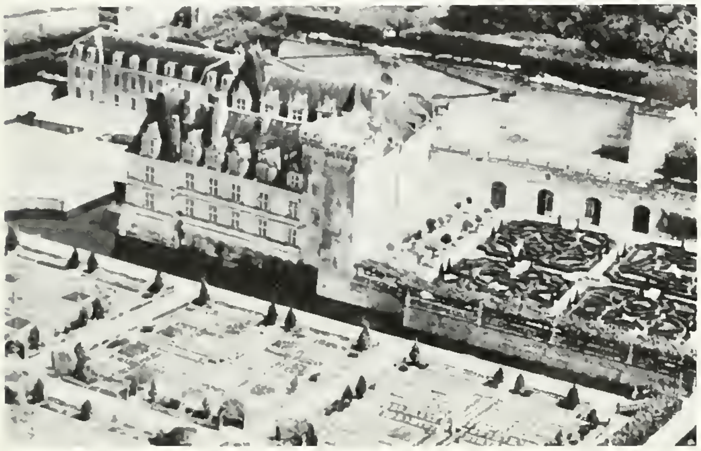
*A bibliography on the subject of this article is obtainable by writing the editor.*

*carrying a bear. The triangular steps between the bear and the bowl symbolize waves. On either side is a great fish and octopus tentacles. The pipe has a copper bowl and is inlaid with California haliotes shell (78248). 6: Tlingit (Sitka) pipe of wood carved to represent the devilfish. The face is a hawk's, and the tentacles are on the sides. It is ornamented with brass (78253). 7: Haida chief Kadawak's pipe of hardwood carved to represent his crest, a dogfish, and inlaid with abalone shell. The pipe is smoked with the fish upside down (79583). 8: Wooden pipe in form of raven's head. The bowl is iron (14382). 9: Tlingit (Stickheen, Wrangell) bone [illegible] bowl lining [illegible] (78052). 10: [illegible] made [illegible] [illegible]*

# Edward E. Ayer Film Lecture Series

**October and November**
**James Simpson Theatre**
*Saturdays, 2:30 PM*

The Edward E. Ayer Film Lectures are held each Saturday in October and November at 2:30 p.m. in James Simpson Theatre. Admission is free at the Museum's West Entrance. Doors open at 1:45 p.m. Members must bring their membership cards for priority seating privileges. When the theatre has reached full seating capacity, the doors will be closed by Security personnel in compliance with fire regulations. Field Museum is a barrier-free institution.



**October 3** *Once upon a Royal River*
by Howard and Lucia Meyers

This film presents a glowing pictorial pageant of the glorious days of France when kings and queens, princes and paramours, lived and loved by the banks of the Loire, the longest river in France. It affords entree to the great royal houses of Medieval and Renaissance France and a rare introduction to their titled owners

**Octobe[illegible]** [illegible] *Whales [illegible] Labrador Tales*
[illegible] Sterling

Visit Tadouss[illegible] established in 1600 and located at th[illegible] and St. Lawrence rivers. Then we pr[illegible] north shore of the St. Lawrence, traveling th[illegible] then north to the tundra and boreal for[illegible] town of Scheffenville. Our journey [illegible] of giant finback, humpback, and [illegible] off the shore at Tadoussac.

**October 17** *Egypt: Open Borders*
by William Sylvester

Our tour of Egypt begins with a flight to Abu Simbel, the greatest moving project ever accomplished. Next we take a cruise on the Nile for a closeup view of activity along the river banks. After a brief look at life in a typical Egyptian village, visit the Valley of the Queens, King Tut's tomb, and the temple complex at Luxor and Karnak. Our trip concludes with a tour of Cairo, Africa's largest city, and Alexandria, Egypt's second largest city.

**October 24** *Austria—Heart of the Tyrol*
by William Sylvester

Racing glacier streams, cows in gala dress, pageantry, festivals, and villagers in their daily lives highlight this whirlwind tour to Austria—Heart of the Tyrol. Visit Salzburg, city of music, and Imperial Vienna, now capital of the Republic. In Innsbruck watch Austria's Olympic ski team train on the summer snow. Our visit concludes with the annual *Talfest*, the valley celebration heralding winter's approach.

**October 31** *Yugoslavia After Tito*
by Frank Klicar

Frank Klicar has filmed his ancestral country with insight and devotion. Daily life on a Croatian farm; Yugoslavians in city and village, at school and at work, all pictured with a personal touch. Here is Yugoslavia at its finest... charming islands, the Dalmatian coast, sunlit seas, ancient architecture, frescoes, modern cities, and rural marketplaces. Yugoslavia presented as a unique combination of natural beauty and living folklore.

**November 7** *The Mediterranean*
by William Madsen

We are taken outside the metropolitan centers of the Mediterranean to discover the places and people of the past and the cultures they inherited. In Spain we visit Elche, site of Europe's most important palm forest, then on to the island of Majorca and a visit with a typical family. Crete, with the Plateau of Lassithi and its thousands of windmills, and Knossos, legendary love of the Minotaur and seat of Minoan culture, is our next port of call. We conclude our trip in Morocco and with a look at Tangier.

**November 14** *Lucky Australia*
by Ken Armstrong

Our trip begins at Rottreat Island, Western Australia, the landing site of the Dutch in 1696 and home of the quokka, an unusual marsupial. After stopping in Perth and Paraburdoo, it's on to Sydney with its Captain Cook Memorial, Melbourne with its picturesque parks, and Brisbane with a side trip to the Love Pine Sanctuary to visit the platypuses, koalas and kangaroos. Our trip concludes with a trip to Uluru National Park in the Northern Territory and a visit to Ayer's Rock.

**November 21** *Spain à la Carte*
by Ric Dougherty

Spain is divided by history and geography into six zones of cooking. See all of Spanish culture depicted in a colorful story that takes you step by step through food preparation in its natural setting. The exciting story of Spain's history and historical places around which developed those distinctively different diets is told as we tour throughout this fascinating country.

**November 28** *Denmark*
by Willis Butler

Mr. Butler takes us on a visit to modern Denmark and its 500 neighboring islands. Enjoy the peaceful farmlands, the four-hundred-year-old inns, and the picturesque [illegible]. Climb the sand dunes and walk through the [illegible]. [illegible] in colorful Copenhagen with a visit to the [illegible] Gardens.

# BAJA CIRCUMNAVIGATED

by ROBERT K. JOHNSON

*Curator of Fishes and Chairman of the Department of Zoology*

*Photos by the author*

TO SAIL IN TROPICAL SEAS, to walk on desert-rimmed shores, to explore islands uninhabited by humans but rich in subtropical life forms—such is the stuff of naturalists' dreams. Especially when the month is February and the naturalists involved live in the Midwest. Those persons who shared in the 1981 Field Museum "Baja Circumnavigated" Tour experienced the reality of this dream.

*Sea of Cortez from summit ridge at Isla Partida*

Departure from Chicago was on the last Saturday of January; our intermediate goal was San Diego. Here we were to meet other members of the tour party organized by Sven Lindblad's Special Expeditions organization. Our vessel was in San Felipe and transport to that northern gulf village was by chartered motor coach. As the chaparral-clad western face of the Lagunas Mountains was replaced by the much more sere vegetation of the eastern slope and Salton Sink, we felt ourselves entering the magic of the Cortez rift valley.

The Gulf of California, also known as the Vermilion Sea and the Sea of Cortez, forms a long rectangle some 680 miles long and 60 to 130 miles wide. Lying in a northwest-to-southeast line, the gulf is bounded by the peninsula of Baja California and the Mexican mainland states of Sonora and Sinaloa. Formed along the line of the East Pacific Rise and its terrestrial extension, the San Andreas Fault, much of the gulf fills the void left by the splitting of the Baja Peninsula from the Mexican mainland. The Imperial and Coachella valleys of California, into which our bus was now descending, represent a structural continuation of the gulf basin. The waters of the gulf once extended to near Mt. San Gorgonio, north of Palm Springs in southern California; but the gulf is now cut off from California by thousands of feet of deltaic deposits from the Colorado River.

Some miles to the south of the busy agricultural city of Mexicali, mud-lined channels and extensive salt flats indicated the nearness of the sea. Tides in the upper gulf are among the most impressive in the world, with a 20-to-30-foot range between high and low. A phenomenon now essentially lost to the northern gulf was the large tidal bore of the Colorado, described as sometimes forming a rolling comber, 6 to 9 feet high, rushing inland 15 or more miles. With diversion of the river's waters for irrigation and other purposes and a consequent reduction in average yearly discharge rates to about one percent of the natural flow, the bore is gone but the tides remain spectacular. As we waited on a beach at San Felipe for transportation by small inflatable boats, the "Humbers," to our expedition vessel, the almost fully exposed pier rising 25 feet above us dramatically demonstrated the great tidal range.

Our vessel, the *Pacific Northwest Explorer,* 143½ feet in length, departed shortly after we boarded. She was to be our home and vehicle for nearly two weeks as we sailed down the length of the Baja Peninsula and up the outer coast to San Diego, a distance of more than 1,400 miles. Integral to Field Museum Tours and the Special Expeditions operation is provision of an interpretive/naturalist staff. As an ichthyologist and a graduate of the Scripps Institution of Oceanography, various aspects of the marine environment were to be my responsibility. Our experience was to be unique in that this was the first time a natural history tour had attempted the near-circumnavigation of Baja California—our trip was the maiden voyage for the tour program and, indeed, for the ship.

The overnight passage carried us across the relatively shallow basin of the northern gulf. In the morning we made landfall at the northern tip of Isla Angel de la Guardia. Second only to Tiburon in size among the gulf islands, it is 42 miles long, volcanic in origin, and, reputedly, second to none in abundance of rattlesnakes. Nearly encircling and forming the protected anchorage of Puerto Refugio are a series of small islands.

The relative shallow draft and high maneuverability of our ship allowed a safe but very close approach to Isla Guanito, where on every side we were greeted by cacophonous sea lions (*Arctocephalus californianus*) while overhead were pelicans, gulls, and brown boobies. Our first "wet landing" and chance to explore beaches, valleys, and hills was on nearby Isla Meija. The more than 100 islands of the gulf contribute greatly to its biological interest, for they exhibit a wide diversity of age, recency of connection to mainland ("oceanic" vs "land-bridge" islands), size, topography, and consequently faunal distinctiveness. Species such as the rattleless rattlesnake (*Crotalus catalinensis*), found only on Santa Catalina Island, exemplify the uniqueness of the insular fauna.

Separating Angel de la Guardia from Baja California is the 8-to-13-mile-wide Canal de Ballenas. Part of the so-called Midriff Region, the gulf's narrowest segment, the Canal de Ballenas is exposed to the full force of the spring tides. With depths to 1,000m, the canal churns and foams with the passage of the waters. Such mixing has the beneficial effect of renewing nutrients in the well-lit surface waters. Such renewal results in rich blooms of phytoplankton, the microscopic plants that are the base of deepwater food chains. The richness is attested to by an extraordinary abundance of game fishes and by the occurrence of a resident population of fin whales *(Balaenoptera physalis)*. The latter, now a sadly depleted species elsewhere, is second in body size only to the blue whale among rorquals—the great baleen whales.

Fins are probably the fastest of all baleen whales, reportedly cruising at about 8 knots and capable of doing better than 20. Despite their speed, the concentration of this population in the Canal de Ballenas was such that there was a good chance we might see them. And see them we did! For more than an hour the speed and maneuverability of our boat allowed us to observe at fairly close range a large pod, or herd, of fin whales. A combination of blue but whitecapped sea, towering and craggy volcanic cliffs in hues of red, orange, and purple, and the continuing high spouts of more than thirty of these magnificent

M/V Pacific Northwest Explorer *off Isla Meija*

*Osprey,* Pandion haliaetus, *returning to nest at central island, Islas San Benitos*

creatures, made it an unforgettable afternoon. An evening ashore at Bahia de las Angeles and a meal provided there by the establishment of Sr. Antero Diaz completed the perfection of the day. Well known to gulf visitors of every occupation and recreational persuasion, Sr. Diaz is a fount of information and legend. We were delighted when he consented to accompany us for the rest of the voyage.

An overnight voyage put us at San Pedro Martir, the most isolated of the gulf islands and, to my mind, among the most wondrous. Rising almost vertically from the sea, this peak reaches 1,052 feet in elevation and yet is less than a mile in diameter. From a distance I was reminded of the High Sierra, dark fir and white granite; the forest I saw, however, was not coniferous but comprised of giant cardon cacti (*Pachycereus*) in rank after rank ascending the guano-stained cliff. The seabirds were magnificent—tropic birds, boobies, cormorants, frigates, and pelicans. Blue-footed boobies engaging in awkward yet stately courtship ritual were the stars of San Pedro Martir; their bright blue feet were absolutely startling on the stark white-on-white rubble slopes.

Each day in the gulf was filled with magic, wonder, and at times humor—the latter expressed, for example, in the faces of a party of four in a lovely sailboat we found anchored at Caleta de San Juanico. Imagine awakening at 6 a.m. in what last night was isolated and starlit wilderness only to find 60 pairs of binoculars temporarily following your every movement. I hope they forgave us.

At Bahia de Agua Verde, Sr. Diaz and Mr. Carlos Nagel, a volunteer and highly valued member of the naturalist staff, obtained permission for us to visit the small but complete fishing and ranching community. The appeals of this timelessly tranquil village to a modern urban dweller can be known only through experience. Merely mentioned in this narrative, but greatly appreciated, were the beauty of Isla del Carmen, the beach at Isla Danzante—where we swam and snorkeled in delightfully warm water, and to our west, the vertical, rugged, wonder of Baja's Sierra de la Giganta—for long a reputed home of Amazons.

Famous for its giant barrel cacti and that endemic rattleless rattlesnake is Isla Santa Catalina—we saw an abundance of the former but none of the latter,.despite extensive searching (a result not displeasurable to all members of the company).

At La Paz, capital city of Baja California de Sur, we briefly reentered the domain of 20th-century civilization, exploring, shopping, and thoroughly loving this vibrant city of 150,000. A sumptuous feast at the Estrella del Mar Restaurant was accompanied by a special performance of local traditional dancers.

The next day we visited the large sea lion colony at Los Islotes, at the north end of Isla Partida. Some of us went snorkeling at a safe distance from the colony and were rewarded by underwater views of the gracefully swimming pinnipeds. We snorkelers were also rewarded by an introduction to the rich gulf ichthyofauna (an estimated 526 shorefish species). Mostly tropical (66 percent of the species range southward, to or beyond Panama), the gulf fish fauna is also fairly rich in endemics (ca. 17 percent), and contains warm-temperate forms (ca. 10 percent) ranging northward along the outer coast, often to southern California. A half-day hike up a dry canyon on Isla Partida immersed us in the gulf island wilderness, an experience immeasurably enhanced by the current richness of the

*Entrance to Puerto Refugio, Isla Angel de la Guardia*

*Blue-footed booby,* Sula nebouxii, *at Isla San Pedro Martir*

vegetation. Due to recent rains, everything seemed in green leaf and bright bloom. In this we were lucky, and we knew it. Late in the afternoon Isla Espiritu Santo, on our port side, seemed to flame, the reds and oranges of its hills and cliffs enhanced by the setting sun.

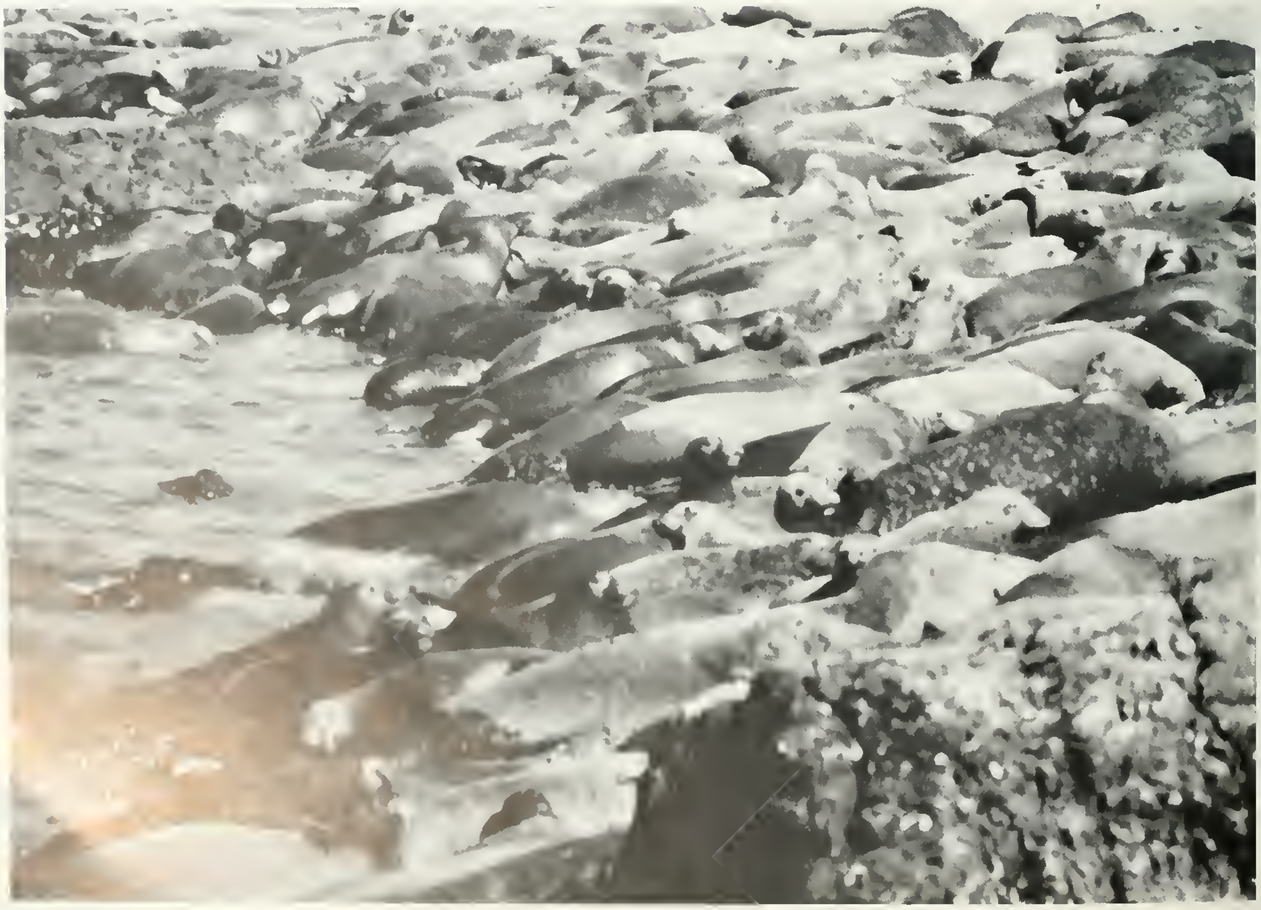
The next morning we were at land's end: Cabo San Lucas, the fabled terminus of the Baja Peninsula and the halfway point in our voyage. Below the fantastic, last formations at Friars Rocks we bathed on a sandy beach, the southernmost in the gulf. A short walk led to the Pacific shore. Neither my diving companion, Gene Callahan, nor I will ever forget our opportunity to snorkle and fish-watch at the southernmost tip. The cape region of the gulf (La Paz to Cabo San Lucas) has very clear water and an essentially tropical fauna, including a number of warm water forms found nowhere else in the gulf. The fauna of this region may well be the richest nearshore fish fauna in the eastern Pacific. Our marvelous week in the gulf had come to an end, but we looked forward now to Magdalena Bay and our first sighting of the gray whale.

Just inside the entrance at Punta Entrada we saw them, spout after spout. To see at close range the gray whale, *Eschrichtius robustus,* was a principle attraction of the voyage. The annual migration of the gray whale between summer feeding grounds in the Chukchi and western Bering seas of the far north and calving sites mainly in the lagoons of Baja, covers more than 50 degrees of latitude. The yearly 10,000-mile roundtrip is longer than the migration of any other mammal. In summer the whales feed on the abundant invertebrate life of the Bering Sea. By December the first migrants, pregnant females, arrive in the warm shallow lagoons of Baja California—Ojo de Liebre, Guerrero Negro, San Ignacio, and Bahia Magdalena. There they give birth and nurse their young. The return trip northward, with newborn calves accompanying their mothers, occurs February to June. Medium-sized (to 50 feet) among whales, no species is more commonly observed by man, because of the gray's habit of staying close to shore on the southward journey. We were able to spend two days inside the Magdalena system of lagoons, closely approaching whales in our Humber boats and never tiring of these sightings.

After a day spent mostly at sea, which provided a chance to catch up on reading or much neglected writing of journals, we approached the entrance to Laguna San Ignacio. In the Bahia Ballenas we observed the spouts of many more gray whales, although not in the thrilling proximity we enjoyed at Magdalena Bay. Because of the popularity of "whale-watching," the Mexican government, on the whales' behalf, has begun to restrict the number of tour-boat entries to the lagunal systems. We were allowed entry to the enormous Magdalena system, while other tours were assigned other lagoons.

The next morning we passed the often fog-bound coast of Cedros Island; we were now be-

*Ashore at Caleta de San Juanico*



*Northern elephant seals, Mirounga angustirostris, "hauled-out" at San Benitos*

*Close encounter at San Benitos*

yond the tropics, in the cooler waters of the California Current. Anchoring in the lee of the Islas San Benitos, we marveled at that supreme statement of algal existence, the giant kelp, *Macrocystis*, but were little prepared for the scene ashore. All along the rough, cobble-strewn beaches of San Benitos were large colonies of the northern elephant seal *(Mirounga angustirostis)*. At 16 feet and two tons (males), the species is the second largest of all pinnipeds. Brutally hunted for its fatty blubber, it was nearly exterminated by the 1890s. Today, all 15,000 or so living northern elephant seals are thought to have descended from a single herd of some 100 that survived on remote Guadalupe Island (about 160 miles off northern Baja). Recovering wonderfully under protection, the species now ranges widely in the eastern North Pacific but breeds only on rocky islands off the coast of southern California and Baja California. For the males, as we observed them, periods of breeding and fighting alternated with what seemed much longer periods of loafing and enjoying the sun that occasionally burned through the mists. The much warier females were more disturbed by our presence, but if we kept still, they generally ignored us. Not so with the sea lions of San Benitos, which would shuffle quickly into the surf as soon as they spotted us, raucously declaring their displeasure. Birdlife abounded at San Benitos, notably nesting ospreys.

At Isla San Martin, just north of Cabo San Quintin, we made our final wet landing. From the sea, the rather benign appearance of this near-perfect volcanic cone belies an absolutely incredible and impenetrable thicket of caterpillar cactus and cholla cactus. Harbor seals *(Phoca vitulina)* observed us with a seemingly shy, aloof demeanor.

An overnight voyage to San Diego, a bittersweet bon voyage party, and only the third gangway-assisted departure, marked the end of this very special adventure. In all we had seen and identified some 120 bird species, 14 marine mammal species, 20 reptile species, more than 70 native plant species and more than 100 species of fishes. No tally of numbers, however, expresses adequately the wonder of watching whales at close quarters, the silence of a desert wash at twilight, the soaring seabirds of San Pedro Martir, and the satisfaction of unique experience.

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*For details on Field Museum's next exciting tour to this region, please turn to pages 24-25.*

# TOURS FOR MEMBERS

*Snorkeling in the Bahamas*

Bahamas Ministry of Tourism

## Ecology Tour of New Providence and Andros Islands

*March 7-14, 1982*

"The Perpetual Isles of June" was Christopher Columbus's name for the Bahama archipelago, a group of more than 700 breathtakingly beautiful islands. With clear blue skies and sea, and coral sand unmarked by silt or sediment, the islands straddle the Tropic of Cancer; the result is a tremendous variety of tropical and subtropical fauna and flora.

The first stop in our 8-day tour will be Nassau, on the island of New Providence, a city which grew as the Bahama's major port. We'll stay at a conveniently located first-class hotel (famed for its fine cuisine), The Pilot House, which overlooks the upper harbor, where native sloops bring produce for dockside sales.

But this tour also includes areas that one would never be able to see on a conventional Bahama tour. From Nassau, we'll fly (12-minute flight) to the tranquillity of Andros Island, the largest and most sparsely populated of the archipelago. Picture a desert island, a cabin facing a sandy beach, waves breaking over the barrier reef and washing slowly shorewards, making the only sound to be heard—this will be our location on Andros. The Andros Field Station has been made available to Field Museum Tours for our study of the marine environment, which will offer a sense of adventure that most of us never experience.

Our study of the barrier reef will be done from specially designed boats; and with the aid of lifejackets, nonswimmers as well as swimmers will be able to enjoy snorkeling to examine the reef's submarine wonderland. The water temperature will be about 78 degrees. The field station is not open to the public and our group will be the only visitors at this time. The accommodations at the station are basic: The cabins are of stone or wood and sleep two to four persons. All have complete baths—but with cold water (warm by our standards!). Dining will be in the Coral Stone Lodge, which also has a lounge, lecture room, laboratory, and soft-drink bar. You may bring your own alcoholic beverages for your own use from the low-priced Nassau stores. After Andros, we'll return to Nassau and The Pilot House.

Margaret Rabley, a biologist with a special interest in ecology, will be our lecturer. Educated at Reading University, in England, she lived in the Bahamas for 14 years (1966-80) and has been to most of the populated islands in the group. During her last 10 years in Nassau, Mrs. Rabley was science coordinator and lecturer at the College of the Bahamas. She has written a book, *The Wild Flowers of the Bahamas and Caribbean* (Collins), and coauthored three Bahamian wildlife field guides. Throughout the trip, many opportunities will be open to us because of Mrs. Rabley's intimate knowledge of the islands and her close association with the Bahamas National Trust (she is past chairperson of its Education Committee).

If you are looking for a tour that combines the luxury of a first-class hotel with the contrast of discovering an island little changed from the time of Columbus, we invite you to join us for a rewarding experience.

## Baja California

*February 6-20, 1982*

Less than 50 Miles South of the U.S.-Mexico border begins a peaceful world of subtropical beauty—the Sea of Cortez (Gulf of California). Over 600 miles long, this gulf is a paradise for marine vertebrate and invertebrate life—and for those of us who enjoy its study. Field Museum members will have the opportunity to know this sea of wonders in a voyage that will all but complete the circumnavigation of the peninsula of Baja California.

The tour will be led by Dr. Robert K. Johnson, curator of Fishes and chairman of the Department of Zoology. Special Expeditions, a division of Lindblad Travel, operators of the ship to be used, will provide several additional naturalists whose expertise will further enrich our experience. Our home for the voyage is the one-class, fully air-conditioned 143.5-foot *MV Pacific Northwest Explorer*, built in 1980.

There are still a few reservations left for this tour; rates depend on the type of stateroom.

## Alaska Native Culture Tour

*June 19-July 1, 1982*

This 13-day tour begins with a flight from Seattle to Sitka, Alaska, where we will spend two days and nights viewing old Russian settlement buildings, Sheldon Jackson Museum, and National Park Service exhibits. Our third, fourth, and fifth nights will be aboard two yachts, which will take us to Admirality

*For tour prices, itineraries, or other tour information, please write the Tours Office, at Field Museum, or call: 322-8862. We would be pleased to put your name on our special mailing list.*

# TOURS FOR MEMBERS

*The incomparable Taj Mahal*

Island. We will see Tenakee Hot Springs, the native villages of Angoon and Hoonah, and make a tour of Glacier Bay.

Sightseeing in Juneau and its environs will be our activity during the next two days, followed by a day and night in Anchorage and a visit by motorcoach to Denali National Park (formerly McKinley National Park), where we will enjoy the spectacular scenery and view wildlife, spending two nights there. A day and a night in Kotzebue, a day in Nome, and a final day in Anchorage will round out the tour.

All hotel accommodations will be first class; the two yachts will accommodate 16 and 10 persons, respectively. Tour rates to be announced.

## Ecuador and the Galapagos

*March 11-25, 1982*

The Galapagos Islands affect our imagination like no other place on earth. Field Museum is pleased to offer its members an opportunity to visit these remote islands under the expert guidance of Dr. John W. Fitzpatrick, associate curator and head, Division of Birds. If you are a "birder" or a "photographer" this tour is a Utopia.

We'll see 500-pound tortoises, ferocious-looking land iguanas that eat cactus flowers, marine iguanas which are superb divers, penguins, flightless cormorants, colonies of sea lions and fur seals, and many other exotic and unique birds, mammals, and reptiles. The plant life, with 40-foot cacti in coastal deserts and dense rain forests in the mountains, is just as interesting.

In addition to the unique sightseeing and learning opportunities on the cruise, we will spend four nights in Quito, Ecuador, where we'll enjoy old world ambience, along with the color of the centuries-old Indian market and villages of Latacunga and Ambato — we'll overnight in Ambato. Our transfer from Quito to Guayaquil will give us a chance to see the country's remarkable scenery. Special attention will be paid to the unique bird life.

Our cruise ship, the 2,200-ton *M. V. Buccaneer*, meets the highest safety requirements. Originally designed to carry 250 passengers, it was refurbished in the United States in 1976 to carry only 90, and has recently been again refurbished. All cabins are outside and are equipped with private shower and toilet. The *Buccaneer* offers a comfortable, informal cruising environment. Although we'll be in the tropics, it will never be unpleasantly hot because of the cooling effect of the Humboldt Current.

The price is $3,550 (per person, double occupancy). We hope you will join us in one of the greatest adventures in travel.

## India/Nepal and Sri Lanka

*January 28-February 28, 1982*

Includes Sri Lanka extension

*(dates tentative)*

See India through the eyes of an American husband-and-wife team, educated at Michigan State University, who have lived in Nepal for the past 12 years, spending most of their time leading nature tours through India/Nepal and Sri Lanka (Ceylon). Bob and Linda Fleming are naturals to lead the Field Museum tour since they have been so closely associated with our work here.

Bob's father was a member of the Museum's scientific staff and collected many species of birds in India and Nepal for the Museum, dating back to the mid-30s. Bob spent a good deal of time at the Museum during his student years, working in the Bird Division. He and his father published a book, *Birds of Nepal, with Reference to Kashmir and Sikkim*, written by Robert L. Fleming, Sr., Robert L. Fleming, Jr. and Lain Singh Bangdel. Bob and Linda have coauthored a number of other books, one on the Kathmandu Valley, published by Kodansha International. He has also written a book on the ecology, flora and fauna of Midland Nepal.

The emphasis for this tour will be ornithology, but many aspects of India will be covered. We'll visit Bombay, with an excursion to Elephanta Caves, Nagpur, and Kanha National Park, Delhi—old and new. Then we'll drive to Jaipur, stopping for lunch at Amber Palace and an elephant ride. Our next stop will be Bharatpur for birdwatching. We'll continue on to Agra, visiting Fatehpur Sikri enroute, then the incomparable Taj Mahal, and the city of Varanasi, seat of Buddhist culture. We'll spend several days in Kathmandu, and of course we're going to Tigertops. An overnight stop in the mountain city of Pokhara and an optional extension to Sri Lanka for 7 days. Rates to be announced. Please call or write to be placed on mailing list.

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Field Museum Tours to **Australia** and to **Kenya** are also being developed for 1982. If you wish to receive details on these tours, when plans are completed, please call the Tours Office (322-8862) or drop us a line, asking to be placed on the mailing list.

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I certify that the statements made by me above are correct and complete *Lorin I. Nevling, Director*

# OUR ENVIRONMENT

## Illinois Forest Cover Vanishing

Illinois currently has the lowest percentage of forest cover of any state east of the Mississippi River, and each year more forest is displaced by agricultural, residential, and industrial development.

Only 10 percent, or 3.5 million acres, of the land area of Illinois presently is forested, according to the report "Illinois Forest Resources: Opportunity for Total Managment." This contrasts sharply with the situation in 1810, when 40 percent of Illinois had forest cover.

Forest resources are valuable in many ways: trees reduce soil erosion, yield lumber, provide wildlife habitat, produce oxygen, and remove air and water pollutants. Forests also serve as recreation areas, and wood and wood products yield energy.

About 93 percent of the forest land in Illinois is privately owned, the bulk of it by farmers. Forests are concentrated primarily in the southern third of the state, along the Mississippi.River and across the northern border of Illinois.

But there are significant stands of trees in urbanized areas along streets, rivers, transportation corridors, power lines, and pipelines; and in parks, forest preserves, cemeteries, golf courses, vacant lots, and private yards. Forest management practices traditionally have focused on rural forest lands but largely have neglected urban tree standards, the report notes.

If Illinois is to derive more benefit from its forest resources, the report recommends, there must be an increased emphasis on cooperative forest management by private owners, the forest products industry, federal and state agencies, and local governments.

Besides making comprehensive use of existing forest resources, reforestation should be practiced more widely in Illinois, according to the report. This might be accomplished, the report suggests, by the establishment of tax incentives which would encourage property owners to maintain or expand woodlots. Farmers, for example, might choose to dedicate marginal land to tree production rather than crops.

## The Endangered Whooping Crane: A Recent Development

The first captive-reared whooping crane [illegible] to be released into the wild [illegible] her new environment — which includes a prospective mate—with apparent success, making U.S. Fish and Wildlife Service scientists optimistic that another innovative means of propagating the endangered species has been found. Like many a mail-order bride in the heydey of the frontier, the three-year-old female has travelled a long distance to begin a new life — from the service's captive flock at the Patuxent Wildlife Research Center near Washington, D.C. to the remote Grays Lake National Wildlife Refuge in Idaho.

Scientists hope she will mate with a male whooper that was hatched at Grays Lake in 1975, the first year of a continuing cross-fostering program in which sandhill cranes serve as surrogate parents. The young whoopers learn a migration route from the sandhills, a critical step in establishing a second wild flock of whooping cranes. The female crane's successful adaptation to the wild would encourage scientists who seek solutions to the shortage of females at Grays Lake, a problem that has slowed population growth. For unknown reasons, female cranes suffer a higher mortality rate than males in the first months of life.

Each step in the female whooper's progress from her Patuxent pen to the Idaho wilderness has been carefully monitored by researchers since this is the first attempt to release a captive-reared whooping crane into the wild.

"Whooping cranes mate for life, and they're very selective,"said Scott Derrickson, who heads Patuxent's crane propagation program. "The disappearance during the last migration of two lone males and the failure of another to stake out a breeding territory left just one possible mate for the female."

The behavior of the two young cranes so far has been encouraging to service scientists at both Patuxent and the Cooperative Wildlife Research Unit at the University of Idaho. When the female arrived at Grays Lake, she was placed in a pen next to the male's territory, so the two could become accustomed to each other without risking her safety. After retreating from her handlers, the female began to forage for food. The male immediately flew near the pen, and the two appraised each other. Within several days, he was spending considerable time close by, and the two were showing signs of bonding by synchronizing their everyday behavior, foraging and preening at the same time. Then the eager female began practicing the species' spectacular premating ritual dance, and the male responded with graceful leaps and swirls.

"There's no question of their mutual attraction," said Derrickson, though he cautioned that the real proof of the birds' pair bond is yet to come. A sturdy bond is shown by the distinctive dual calls for which the cranes are named, a duet composed of one note sounded by the male, followed by two stacatto notes by the female. The two have begun calling to each other, but have not yet united in a duet. Meanwhile, the female has been released from her pen, since the male appeared disturbed by the barrier.

"We might have heard their 'unison call' by now if the male hadn't gotten sidetracked from courtship," said Derrickson. "Suddenly, for an accountable reason, he began to try to expand his territory in two directions at once. However, he keeps returning to the female's roost, and we think that when his wing feathers molt and he can't fly, he won't be this aggressive.

"If these whoopers form a bond, it's possible they could produce a chick as early as next spring," added Derrickson, who explained that females may become sexually mature at four years of age. The transplanted female is too young to breed this year, but is old enough to establish a lifetime pair bond. The male has shown his readiness for several years by his territorial behavior.

Should the whoopers fail to establish a bond before the fall migration, the female will be sent back to Patuxent, since she could not survive without an experienced mate to guide her to wintering grounds at Bosque del Apache National Wildlife Refuge in New Mexico. This 870-mile migration route was imprinted on the male by his foster sandhill parents.

"We learned from an experiment last year that captive-reared sandhill cranes transplanted to the wild *must* integrate with the other birds to know when and where to migrate," emphasized Derrickson. "This principle applies to whooping cranes, and we hope this female represents the beginning of a new program to speed their reproduction."

Transplanting captive-reared females could be the newest in a number of successful techniques that have restored the whooping crane from a low of 15 in 1941 to this year's record number of nearly 100 birds in the wild and 24 in captivity. But, at the moment, scientists are listening for the raucous but welcome unison call that will signal the successful pairing of the two young cranes . . . and the prospect of new whoopers to come.

# October and November at Field Museum

*October 16 through November 15*

### Continuing Exhibits

HALL OF ANCIENT EGYPTIANS. The large stone sarcophagi on either side of the entrance beckon you into one of Field Museum's most popular exhibits. Four thousand years of ancient Egyptian culture are represented by household objects, arts, crafts, and funerary artifacts. Some of the highlights of the collection are the great cedar funerary ship from Dashur, the cast bronze cat sacred to Bast, and human and animal mummies. Hall J, Ground Floor.

PAWNEE EARTH LODGE. Hall 5 contains a full-scale replica of a Pawnee earth lodge, the home and ceremonial center of Pawnee Indians in the mid-1800s. Daily public programs provide opportunities to learn about Pawnee culture: Monday-Friday 12:30 p.m.; Saturdays 11 a.m., 12:15 p.m., and 1:15 p.m. Open House on Sunday from 11 a.m. to 3 p.m.

THE PLACE FOR WONDER. This gallery provides a "hands-on" approach to natural history. Feel the skin of a rattlesnake, try on a bamboo backpack from China, examine a dinosaur bone, and more—this room is full of touchable exhibits. Trained volunteers help guide exploration and answer questions. Open weekdays 1 to 3 p.m.; weekends 10 a.m. to noon and 1 to 3 p.m. Ground Floor, near cafeteria.

### New Programs

PARENT-CHILD WORKSHOPS. Cooperating with your child on a project related to Field Museum's exhibits is the theme of these workshops. Participants can choose to fashion Chinese shadow puppets, dye batik T-shirts, make metal castings, learn to write in Egyptian hieroglyphs, play games from around the world, learn temple dances from India, make flutes, or study Indian lore. Preregistration is required. See *October Calendar of Events* for registration coupon and more information, or call 322-8854. Saturdays, October 10 and 17.

RAY A. KROC ENVIRONMENTAL FILM LECTURE: "Follow A Wild Dolphin." The close friendship between Dr. Horace Dobbs and a wild dolphin is the subject of this informative and entertaining film/lecture. Dr. Dobbs is an author, naturalist, underwater photographer, documentary filmmaker and founder of International Dolphin Watch, a British research program designed to help conserve the dolphin population. Tickets are $3 for Members; $5 for Nonmembers. Friday, October 23, at 8 p.m. James Simpson Theatre.

DINOSAUR DAY. A day of activities devoted to the largest and most successful animal that ever lived. Participants will learn to distinguish between fact and fantasy through slide lectures, tours, demonstrations, and movies. The programs are free. A complete schedule of events will be available at Museum entrances on the day of the event. For more information, call 322-8854. Sunday, November 8, from 11 a.m. to 4 p.m.

FABRIC OF CULTURE FESTIVAL. A day of activities related to textiles is planned in conjunction with the Learning Museum course, "Rugs of the Orient: Threads of Time." There will be sheep shearing, spinning, silk screening and many other demonstrations. Visitors may bring their textiles in for expert commentary and evaluation. Sunday, November 15, from 11 a.m. to 5 p.m.

EDWARD E. AYER LECTURE SERIES. Explore distant corners of the world every Saturday during October and November at 2:30 p.m. in James Simpson Theatre. Narrated by the filmmakers themselves, these free 90-minute film lectures are recommended for adults. Admission is through the West Door; Members receive priority seating. Oct. 17: "Egypt: Open Borders" with William Stockdale. Oct. 24: "Austria—Heart of the Tyrol" with William Sylvester. Oct. 31: "Yugoslavia After Tito" with Frank Klicar. Nov. 7: "The Mediterranean" with William Madsen. Nov. 14: "Lucky Australia" with Ken Armstrong.

FALL JOURNEY: "LOOKING AND SEEING." Field Museum dioramas present a glimpse of a habitat frozen in time. With this self-guided tour you can examine the main themes of several dioramas as well as discover some half-hidden surprises in the detailed backgrounds. Free *Journey* pamphlets available at Museum entrances.

*Continued on back cover*

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# October and November at Field Museum

*Continued from inside back cover*

### Continuing Programs

Weekend Discovery Programs. On Saturday and Sunday you can participate in a variety of free programs on natural history topics. This month's Film Features focus on "Magnificent Mammals." Check *Weekend Sheet* at entrances for locations.

Saturday, Oct. 17: "Ancient Egypt" tour covers everyday and ceremonial life. 11:30 a.m.

Saturday, Oct. 17: "Saga of the Sea Otter," a Magnificent Mammal film. 1 p.m.

Sunday, Oct. 18: "The Great Tombs of Early Ancient Egypt," slide program featuring old and new views of mastabas and pyramids. 1:30 p.m.

Saturday, Oct. 24: "Mzima—Portrait of a Spring," a Magnificent Mammal film starring an African hippopotamus. 1 p.m.

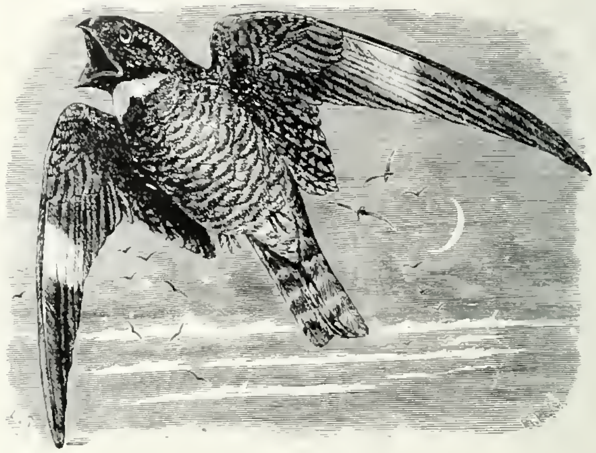
Saturday, Oct. 24: "Malvina Hoffman," a film program of her early expeditions is followed by a tour of her bronze statues. 2 p.m.

Sunday, Oct. 25: "Life in Ancient Egypt," tour of objects illustrating Nile Valley life. 2:30 p.m.

Saturday, Oct. 31: "Halloween Fun" films and tours. 11 a.m. and 3:30 p.m.

Saturday, Oct. 31: "Death of a Legend," a Magnificent Mammal film examining wolves. 1 p.m.

Sunday, Nov. 1: "Preparation for Afterlife in Ancient Egypt" tour reviews ancient Egyptian beliefs about eternal life. 12 noon.



Sunday, Nov. 1: "Champollion in Egypt," slide program about an early expedition as seen through Champollion's drawings. 1:30 p.m.

Sunday, Nov. 1: "New World Foods." How plants from the Americas influenced cultures around the world. 2:30 p.m.

Saturday, Nov. 7: "Native American Foods" tour covers diet and food gathering of native Americans. 11:30 a.m.

Saturday, Nov. 7: "This Land," an American Heritage film on the evolution of the North American continent. 1:30 p.m.

Saturday, Nov. 14: "Ancient Egypt," tour of everyday and ceremonial life. 11:30 a.m.

Saturday, Nov. 14: "The First Americans," an American Heritage film about the first men to inhabit this continent. 1:30 p.m.

Volunteer Opportunities. Individuals interested in working with school groups, presenting tours, and participating in other educational programs are asked to contact the volunteer coordinator at 922-9410, ext. 360.

October and November Hours. The Museum opens daily at 9 a.m. and closes at 5 p.m. (4 p.m. beginning November 1) every day except Friday. On Fridays the Museum remains open until 9 p.m. throughout the year.

The Museum Library is open weekdays from 9 a.m. to 4 p.m. Obtain a pass at the reception desk, main floor.

Museum Telephone: (312) 922-9410

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LD MUSEUM OF NATURAL HISTORY BULLETIN

NATURAL HISTORY SURVEY
NOV 16 1981

November 1981

# Ancient Egypt

## *Dynasty V Tombs Opened to View*

**Field Museum
of Natural History
Bulletin**

Published by
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Founded 1893

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## Henry S. Dybas
*1915-1981*

It is with regret that we announce the death, on October 5, of Henry Dybas, curator emeritus, Insects, following a long illness. He had been retired only a little more than one year. Dr. Dybas was associated with Field Museum for more than 45 years; from 1941 to 1980 he served successively as assistant, assistant curator, associate curator and curator of Insects, and from 1971 to 1974 as head of the Division of Insects.

Henry Dybas was totally dedicated to the Museum and made many important contributions to the programs of the Division of Insects, the Department of Zoology, and to the Museum as a whole. He was an outstanding field collector and biologist, and carried out field work in Colombia, Mexico, Panama, Micronesia, Canada, and the United States. His Pacific collections served as the impetus for an extensive survey and resulting volumes of *Insects of Micronesia*.

His research interests centered on the systematics, ecology, population biology, and evolution of periodical cicadas and of Ptiliidae, the smallest known beetles. (He was recognized as the world authority on this family.) In recognition of his scientific contributions, he was honored in November, 1980, by a special symposium and an Sc.D. degree by Tri-State University, Angola, Indiana.

Dr. Dybas is survived by his wife, Milada, his daughters, Dr. Linda Dybas and Ms. Marcia Carr, his parents, Mr. and Mrs. Martin Dybas, his sister Mrs. Evelyn Thomas, his nephew, Brian Baumruk, and his niece Karen Heaton. His career and contributions will be more extensively treated in a future issue of the *Bulletin*.

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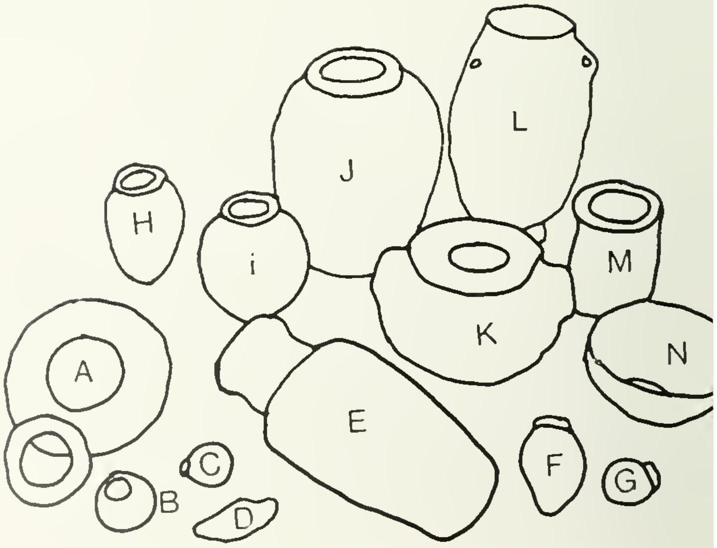

COVER

*Egyptian stone vessels in the Field Museum collection:* A) *limestone vase with separately made rim, Archaic period, #173261;* B) *lapis lazuli vase, Naqada II, #30704;* C) *serpentine vase with gold handles, Archaic period, #30702;* D) *flint lunate scraper of the type used to hollow out stone vases, Fayum neolithic period, #216417;* E) *diorite unfinished stone vessel, dynastic, #31557;* F) *malachite vase Naqada III, #30712;* G) *serpentine miniature lentoid flask, #30748.* H) *red breccia vase, Naqada III, #31750;* I) *imperial porphyry jar Naqada III, #30677;* J) *diorite jar, Archaic period, #30686;* K) *red breccia jar, Naqada II, #105154;* L) *basalt vase with trumpet foot. Naqada I, #31742;* M) *limestone cylindrical vase, Archaic period. #173287;* N) *quartz-diorite bowl, Archaic period, #30671. (For explanation of historic periods, see time line, page 4, and discussion in "Predynastic Egypt," pp. 7-12, by Peter Lacovara.) Photo by Ron Testa.*

# In the Shadow of the Pyramid

## *An Introduction to the Exhibit*

*by* DONALD WHITCOMB

FOR MANY VISITORS to the Field Museum, those who were brought by their parents and now bring their own children, the display of Egyptian antiquities in the Field Museum has taken on a permanence and unchangeablity which is very appropriate for ancient Egypt. Indeed, most of the Egyptian Hall, Hall J, has not changed in content or style of display since the 1930s.

However, the science of Egyptology has progressed enormously in the last fifty years; likewise, there have been major developments in both the style and aims of exhibition techniques. The modern museum has become a much more educational facility than its antecedent of several generations ago. When Field Museum's Egyptian Hall was first organized, it was assumed that the public would come and "appreciate" the objects, enjoying their esthetic qualities and the opportunity of seeing rare historic artifacts. Today this is not enough; we seek to form an understanding of what we look at, and try to comprehend the life of these ancient peoples as reflected in the objects and monuments which they left.

Thus, when E. Leland Webber (then Field Museum president) approached me almost one year ago with a longstanding dream of opening Field Museum's two Old Kingdom tomb chapels from Saqqara, near Djoser's step pyramid, I greeted the project with enthusiasm. Such a reinstallation would give us the opportunity to modernize at last the archaic displays of predynastic through Old Kingdom materials in Field Museum's Egyptian Collection.

This reinstallation consists of two parts. First, glass is placed directly in front of the reliefs on the chapel walls so that wherever possible the rooms can be opened to the public. By actually entering

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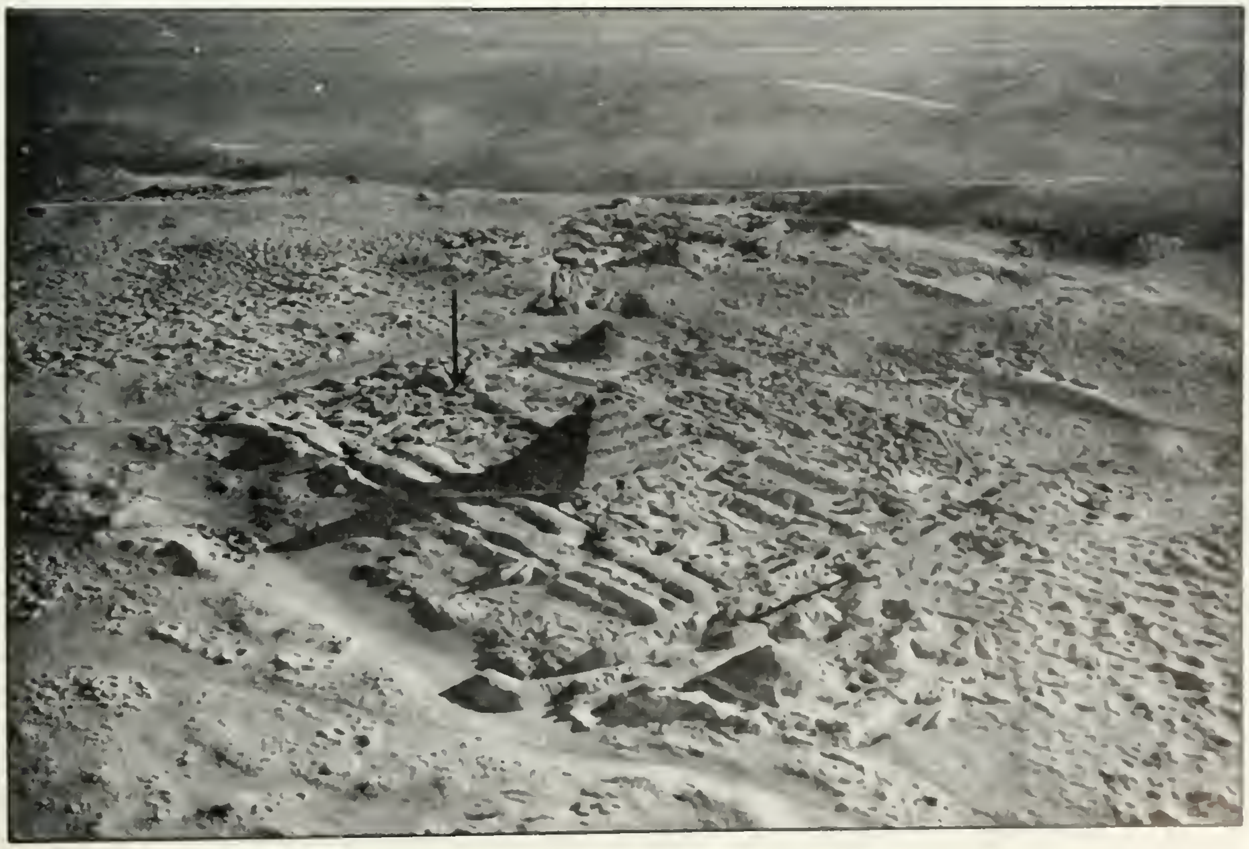
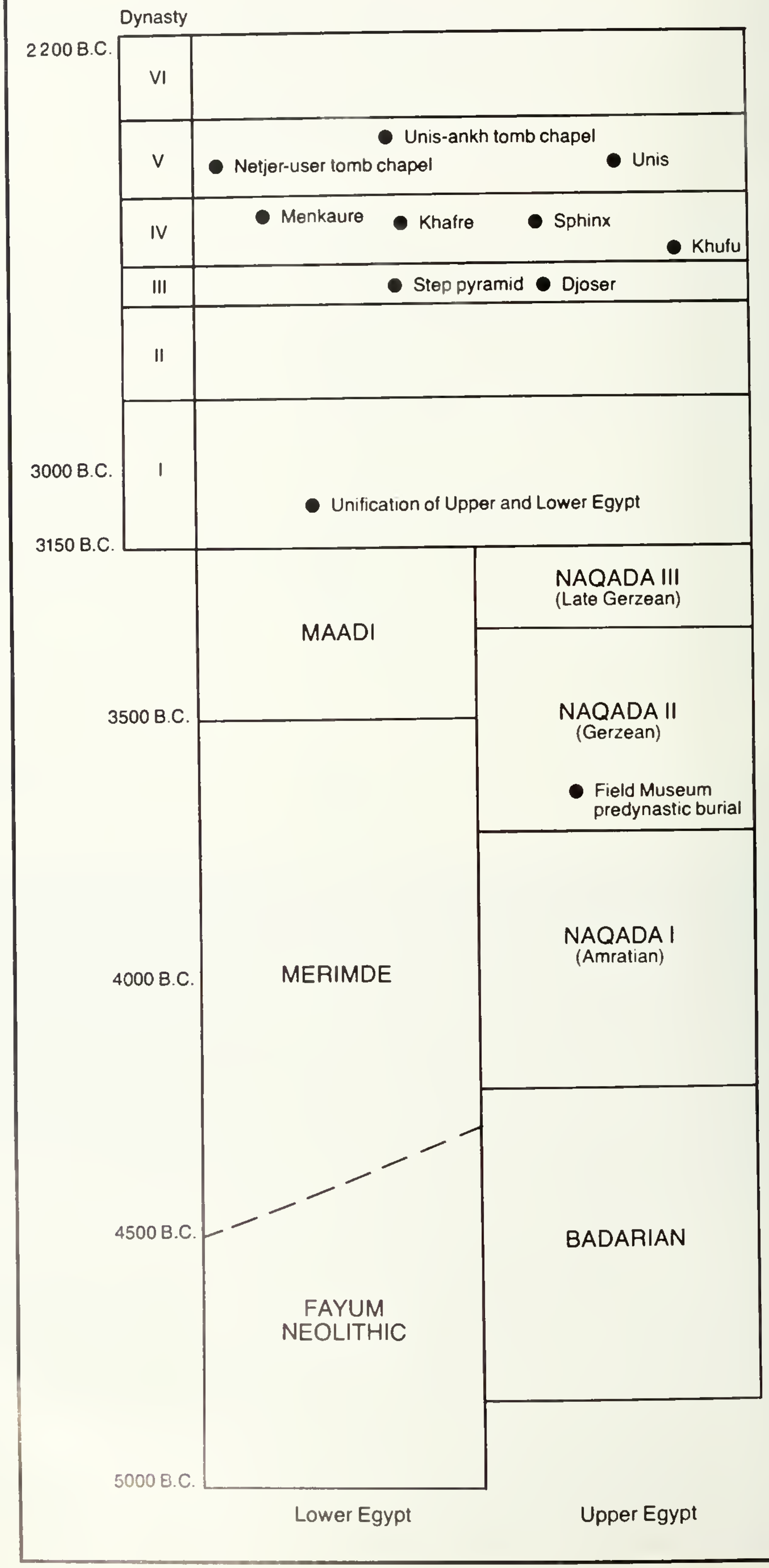
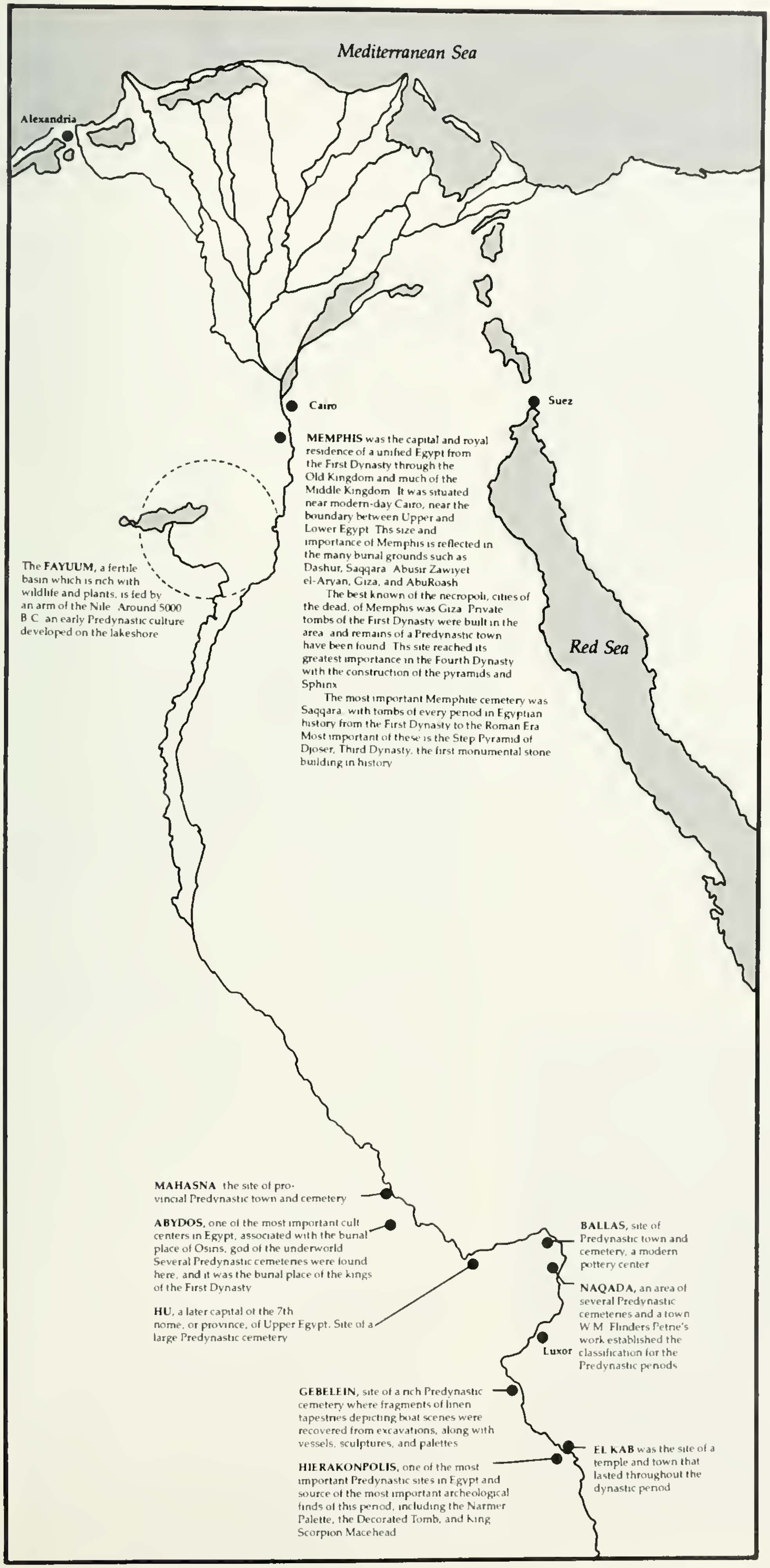
*Donald Whitcomb is a research fellow at the Smithsonian Institution and was formerly assistant curator of Middle Eastern archeology at Field Museum.*



*The step pyramid of Djoser, at Saqqara, Egypt, built during Dynasty III. Arrow to lower right shows location of tomb of Unis-ankh. Upper left arrow indicates location of tomb of Netjer-user. Portions of both tombs were acquired by Field Museum in [illegible] now, for the first time, are being opened to public view in Hall J. Photo by [illegible] Breasted, [illegible] Courtesy of the Oriental Institute [illegible]*

# Ancient Egypt 5000-2200 B.C.





**MEMPHIS** was the capital and royal residence of a unified Egypt from the First Dynasty through the Old Kingdom and much of the Middle Kingdom. It was situated near modern-day Cairo, near the boundary between Upper and Lower Egypt. This size and importance of Memphis is reflected in the many burial grounds such as Dashur, Saqqara, Abusir Zawiyet el-Aryan, Giza, and AbuRoash.

The best known of the necropoli, cities of the dead, of Memphis was Giza. Private tombs of the First Dynasty were built in the area, and remains of a Predynastic town have been found. This site reached its greatest importance in the Fourth Dynasty with the construction of the pyramids and Sphinx.

The most important Memphite cemetery was Saqqara, with tombs of every period in Egyptian history from the First Dynasty to the Roman Era. Most important of these is the Step Pyramid of Djoser, Third Dynasty, the first monumental stone building in history.

The **FAYUUM**, a fertile basin which is rich with wildlife and plants, is fed by an arm of the Nile. Around 5000 B.C. an early Predynastic culture developed on the lakeshore.

**MAHASNA**, the site of provincial Predynastic town and cemetery

**ABYDOS**, one of the most important cult centers in Egypt, associated with the burial place of Osiris, god of the underworld. Several Predynastic cemeteries were found here, and it was the burial place of the kings of the First Dynasty

**HU**, a later capital of the 7th nome, or province, of Upper Egypt. Site of a large Predynastic cemetery

**BALLAS**, site of Predynastic town and cemetery, a modern pottery center

**NAQADA**, an area of several Predynastic cemeteries and a town. W.M. Flinders Petrie's work established the classification for the Predynastic periods

**GEBELEIN**, site of a rich Predynastic cemetery where fragments of linen tapestries depicting boat scenes were recovered from excavations, along with vessels, sculptures, and palettes

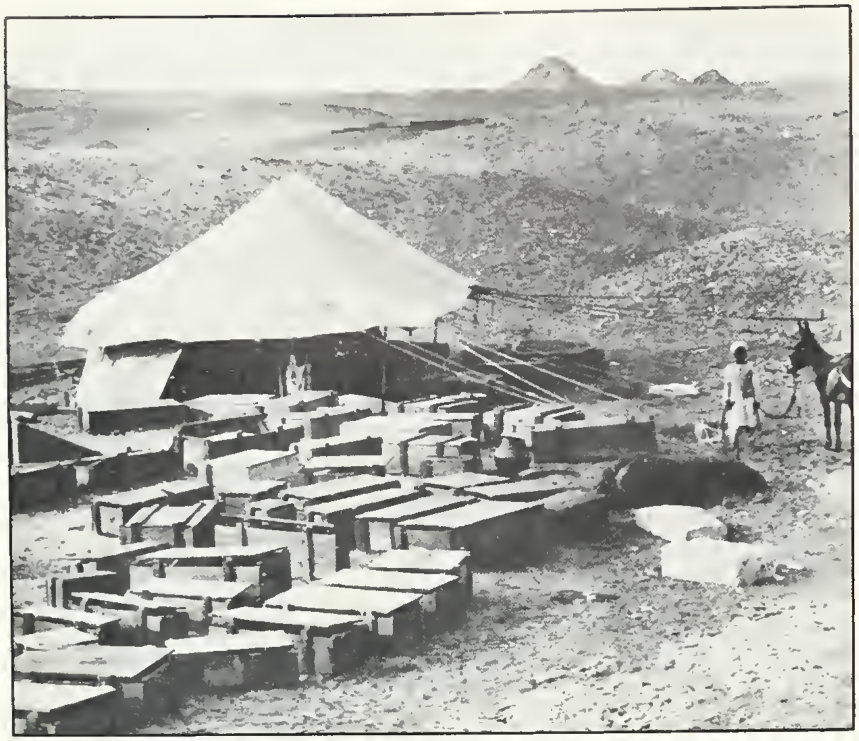
**HIERAKONPOLIS**, one of the most important Predynastic sites in Egypt and source of the most important archeological finds of this period, including the Narmer Palette, the Decorated Tomb, and King Scorpion Macehead

**EL KAB** was the site of a temple and town that lasted throughout the dynastic period

the rooms of the tomb chapels, the Museum visitor will gain a much better understanding of the tomb as architectural space.

The second part of the reinstallation focuses on the objects in the collection. The artifacts from Ancient Egypt in the Egyptian Hall have long been arranged in a sort of typology with, for instance, all the alabaster vases in one case, all the ushebties (servant figurines placed in the tombs) in another, canopic jars in another, and so forth. This style of presentation is useful for the archeologist who uses stylistic trends for chronological and regional differentiations, but such an arrangement also removes the objects from their original, natural association with one another. The Oriental Institute Museum of the University of Chicago has a very handsome typological display from which the student of Egyptian archeology may learn much. The purpose of the Field Museum Egyptian Hall, however, is not to teach archeology but to explore and explain for the viewer the environmental and cultural history of this part of the ancient world. The two approaches are complementary, and ideally the Field Museum, with its great collections of fauna and flora as well as artifacts, is ideally suited to study the broad interconnections of land and people. This goal can be simply realized by providing a large map of Egypt and a time line chart to orient the visitor geographically and chronologically. Likewise, in the reinstalled exhibit, a photo of the Step Pyramid of Djoser with two arrows indicating the two Field Museum tomb sites dramatically demonstrates the relationship of this pyramid with the tombs, which were located almost literally in the pyramid's shadow.

The exhibition begins with the prehistoric period, before the unification of all of Egypt under one ruler, when groups settled in villages along the Nile, adding irrigation agriculture to hunting and fishing economies. During this predynastic period, the characteristic Egyptian culture would coalesce and political unity under the pharaoh began to develop. In the predynastic alcove one sees a naturally mummified burial. Natural mummification led, indirectly, to the art of mummification. The alcove's pottery and stone vessels reflect the high standards of craftsmanship and art which led to elaborate Old Kingdom tombs, just as the ideas and hieroglyphic symbols of this early period anticipate


Above: *Tomb segments, dismantled, ready for shipment to the United States. About 1909.*

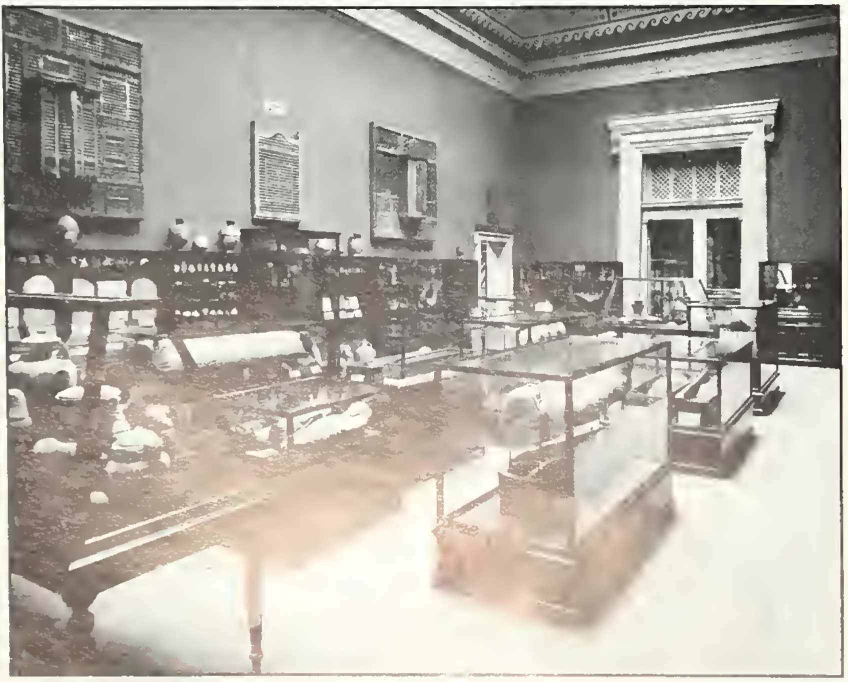
the Old Kingdom concepts of kingship and divine order. The predynastic alcove is a necessary prelude to understanding the tombs of the Old Kingdom.

The two Field Museum tombs are offering chapels, not actual burial chambers. The reliefs are mainly of offering processions, with the good things of this life piled in abundance for the eternal happiness of the deceased. To facilitate the visitor's understanding of this ritual, the heiroglyphic inscriptions, both prayers and captions above the figures, are translated into English wherever possible. In addition, objects dating to the Old Kingdom —many actually identical with ones depicted on the walls of the tombs—have been placed in the tomb chapels of Netjer-user and Unis-ankh.

Such tomb chapels, as an expression of the development of the state in Old Kingdom Egypt, are an official art resulting from a highly complex, stratified society. While these chapels and the royal pyramids are symbolic of the height of power, they also serve as a qualitative contrast to the basic culture of Egypt. This basic culture is embodied in the rural agricultural village culture, which has continued from ancient times almost to the present day. This agricultural setting, tied with the annual flood of the Nile, is the focus of one of the newly organized cases adjoining the Old Kingdom tomb chapels. Aspects of this life along the Nile are depicted in many tombs. Touchable plaster casts of two such reliefs from the tomb of Ptah-hotep (also from Saqqara and approximately contemporary with Netjer-user) have been included in the reinstallation to alleviate the frustration of visitors to the glass-protected tomb chapels. The first Ptah-hotep relief depicts activities which took place on the river edge: papyrus boatmaking, ropemaking, and fish drying. The second relief shows a mock combat as frivolous boatmen try to knock each other into the water; meanwhile, the sculptor of the tomb enjoys the tableau and takes some refreshment after his labors. The scenes are a celebration of the well-ordered life of work and bounty which the Nile has provided for millennia.

The purpose of the reinstallment of the predynastic and Old Kingdom artifacts and the opening of the tombs is twofold: First, to bring about an understanding of this remote and mysterious culture, which has intrigued and excited the imagination since the arrival of the first ancient Greek tourists in Egypt. Secondly, we hope to enhance the appreciation of ancient Egyptian craftsmanship and artistry—we come to praise the ancient Egyptians. The tomb chapels now can be visited and, thereby, as Unis-ankh and Netjer-user had intended, their memory is preserved. In a way, their lives and accomplishments are celebrated by a posterity whom they could scarcely have imagined. The dignity and rhythm of their lives on the banks of the Nile have, in a mysterious way, an effect on the quality of our own lives; there is a deepening and broadening of our experience through the continuing existence of these monuments and artifacts.

The exhibition, then, is a reorganization of the Field Museum artifacts of the predynastic period and the Old Kingdom, centered around the tombs. It is our hope that this will eventually be followed by the reorganization of the entire Egyptian hall, with a progression of chronological sections and predominant cultural themes such as religion and politics. It is hoped that the vision of E. Leland Webber and the many specialists who have worked on this project might find its fruit in a new understanding of ancient Egypt on the part of members and visitors to the Field Museum. □

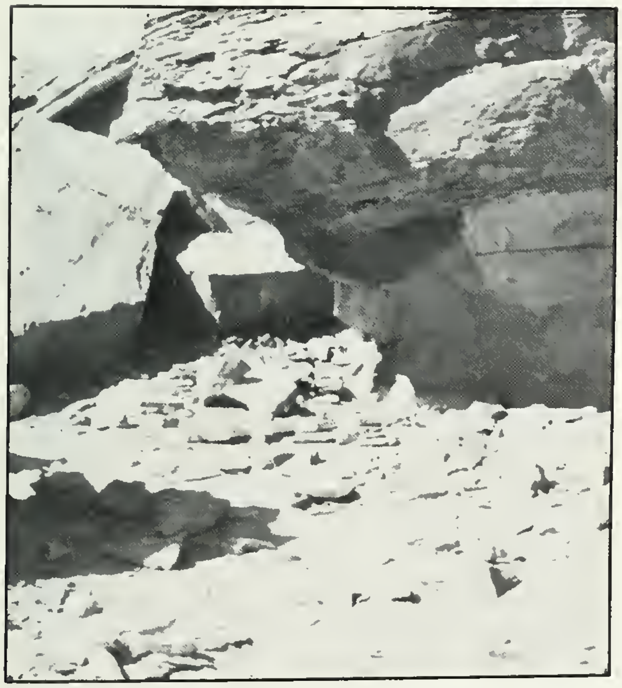

Below: *Portion of the Egyptian Hall, in the Museum's original building, in Jackson Park. About 1900. Since that time, museum exhibits have been designed to instruct, rather than simply entertain, please the museum-goer's eye, and satisfy his curiosity.*

# Predynastic Egypt

*by* PETER LACOVARA

EGYPT, FOR MOST PEOPLE, brings to mind Cleopatra, Tutankhamun, or the Sphinx and Pyramids; however, the most significant period in the development of Egyptian civilization, greatly antedating these, was probably the two thousand years that preceded the unification of Egypt into a single state, which occurred about 3150 B.C.

Though the Nile Valley was home to a number of Paleolithic and Epipaleolithic peoples, some of them quite advanced, the connection between these groups and the Neolithic cultures of the predynastic period remains a mystery. It has been suggested that severe floods may have decimated the indigenous population, leaving the valley open to migrants from the west or elsewhere.



**1.** *(Above) Sun-dried pots were stacked upside-down in a sheltered area with a strong draft and covered with a pile of animal dung that served both as the kiln superstructure and as the fuel itself.*

Whatever the case, between 5000 and 4500 B.C., several settled agricultural communities appeared in the areas of the Delta, Fayum, and Upper (southern) Egypt. Much more is known about the area of Upper Egypt because of the concentration of archeological work in that area.

Our picture of the predynastic period is based principally on the work of Sir Flinders Petrie and another English archeologist, Guy Brunton. At the end of the last century Petrie excavated the site of Naqada, near modern Luxor, and eventually realized that the objects he had uncovered predated any period that was previously recognized in Egypt. By organizing the pottery from individual burials on the basis of style and technological development he was able to place the grave groups in chronological order and successfully date them long before the development of modern methods of absolute dating such as Carbon 14.

The predynastic period in Upper Egypt has been divided into four main stages. Stage I is known as the Badarian (*ca.* 4800-4200 B.C.) and is characterized by black-topped bowls with a carefully polished surface and household pottery which shows Nubian influence.

Stage II, the Naqada I, or Amratian Period (*ca.* 4200-3700 B.C.), continued Badarian traditions; these included pottery with a polished red surface and black band around the mouth in a new variety of shapes and forms (fig. 3) as well as plain red pottery, which was occasionally decorated with white pigment.

The black top on the pottery resulted from firing in a simple "bonfire kiln": Sun-dried pots were stacked upside down in a sheltered area with a strong draft (fig. 1) and covered with a pile of animal dung that served both as the kiln superstructure and the fuel itself. Since the mouth of the pot rested in the ashes, it was not oxidized during firing but remained black, while the carbon was burnt out of the exposed surface, which turned red. This technique was no doubt accidental at

**2.** *(Below) Temperature regulation in the primitive kilns was difficult, so that overfiring occurred, producing partially melted pots, or "wasters."*

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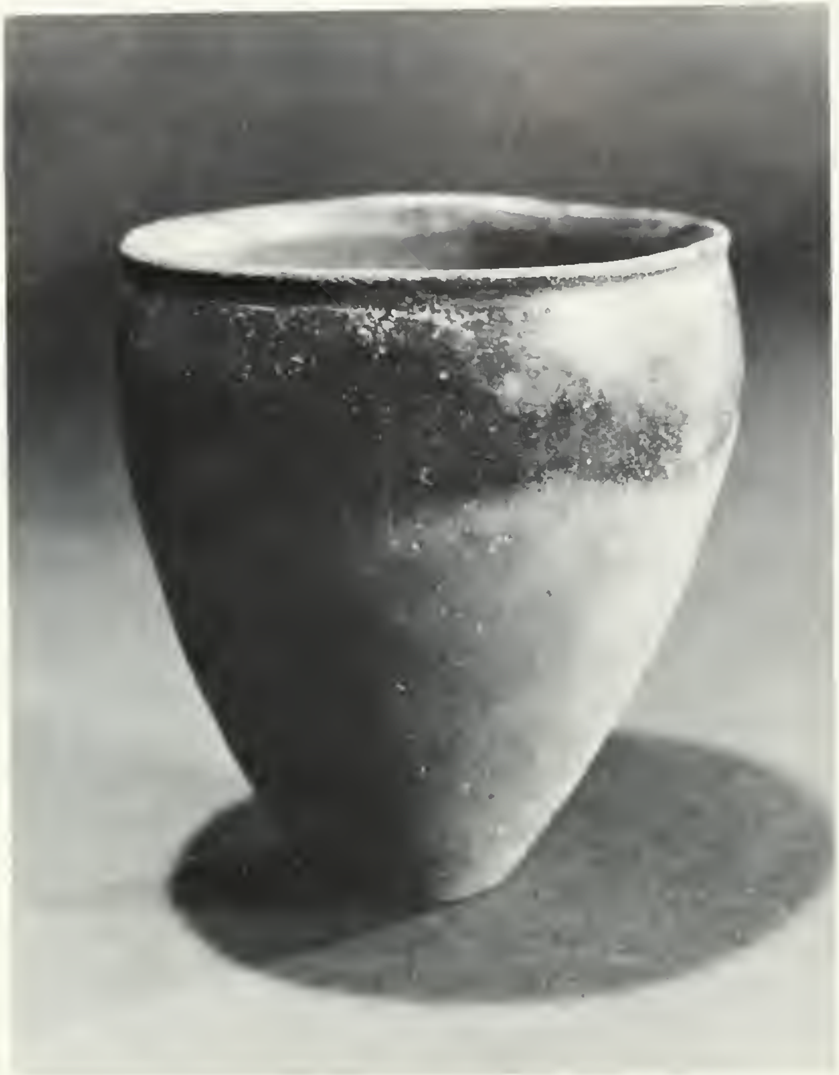
*Peter Lacovara is a doctoral candidate in Egyptology at the University of Chicago.*



**3.** *(Above) Black-topped vase with indented rim from Naqada. Gift of Sir Flinders Petrie. Early Naqada. Height 16 cm. #31467.*

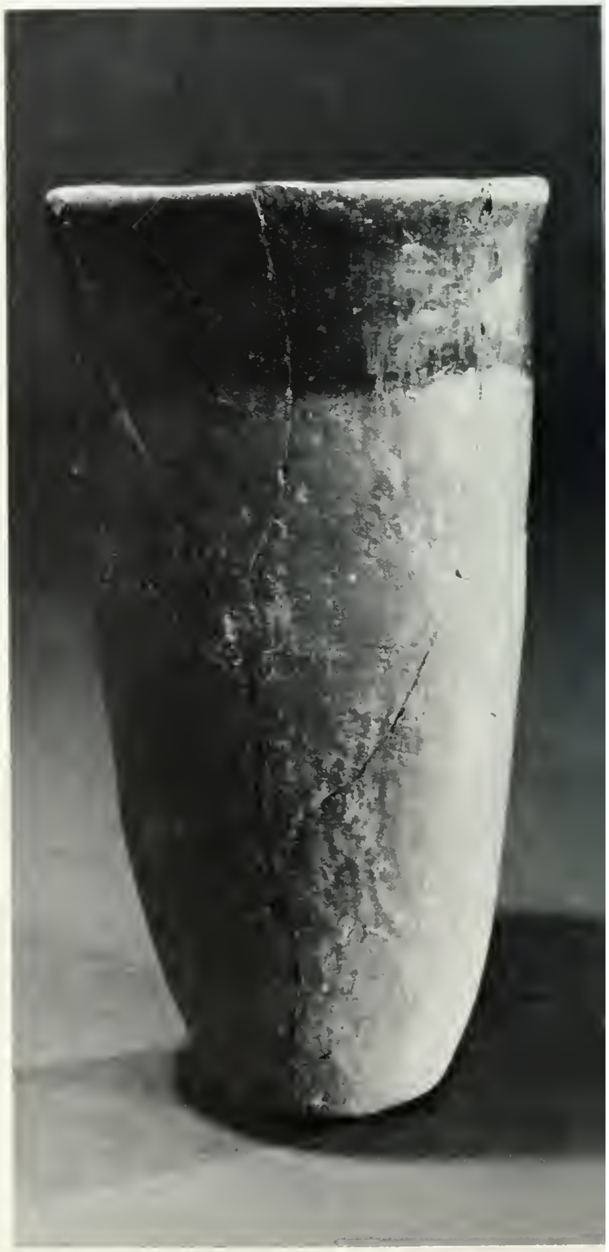
first, but became intentional because of the pleasing color combination that resulted. Temperature regulation was difficult in these kilns, so that overfiring occurred, producing partially melted pots, or "wasters" (fig. 2).

Ceramic production became more sophisticated in stage III, the Naqada II, or Gerzean Period (*ca*. 3700-3300 B.C.). Black-topped pottery continued to be produced but in more complex forms with constricted mouths and rolled rims (fig. 4). In addition to Nile mud a new type of clay, derived from desert marls, came into use. This clay, when fired, produced a tan or buff surface that was sometimes decorated with representational and abstract designs in red paint (fig. 5). More sophisticated kilns were developed, and in Naqada III (stage IV) we see beginnings of mass production in rough straw-tempered wares (fig. 6). Pots sometimes were marked with signs which may have indicated ownership, intended use, or place of production. The rims of some were occasionally finished on a flat or rotating base, then joined to the hand-made body of the pot. Wheel-made pottery did not appear in quantity until the Old Kingdom, with the finely made vessels of the so-called "Meydum Ware" (fig. 7).

Pottery was eventually overtaken by the producers of stone vessels. Although they occur in earlier periods, stone vessels were never as common as in the Gerzean (stage I) nor were they found in as many different shapes or materials (see front cover).

Even though stone vessels were made from extremely hard stones such as basalt, porphyry, and granite, metal tools were not generally used to work the stones. The desired shape was roughed out with a pick and the surface smoothed down and polished with a quartz sand abrasive. The interior was hollowed out with a lunate-shaped flint attached to a drill with weights; these provided added pressure and increased momentum as the drill was turned (fig. 10). After drilling the interior was sometimes trimmed down further by scraping and, in the case of plates and bowls, polished smooth.

The refinement of the stone-carving craft is



**4.** *(Right) Cylindrical black-topped vase from Abydos. Naqada II. Height 25.5 cm. #175999.*

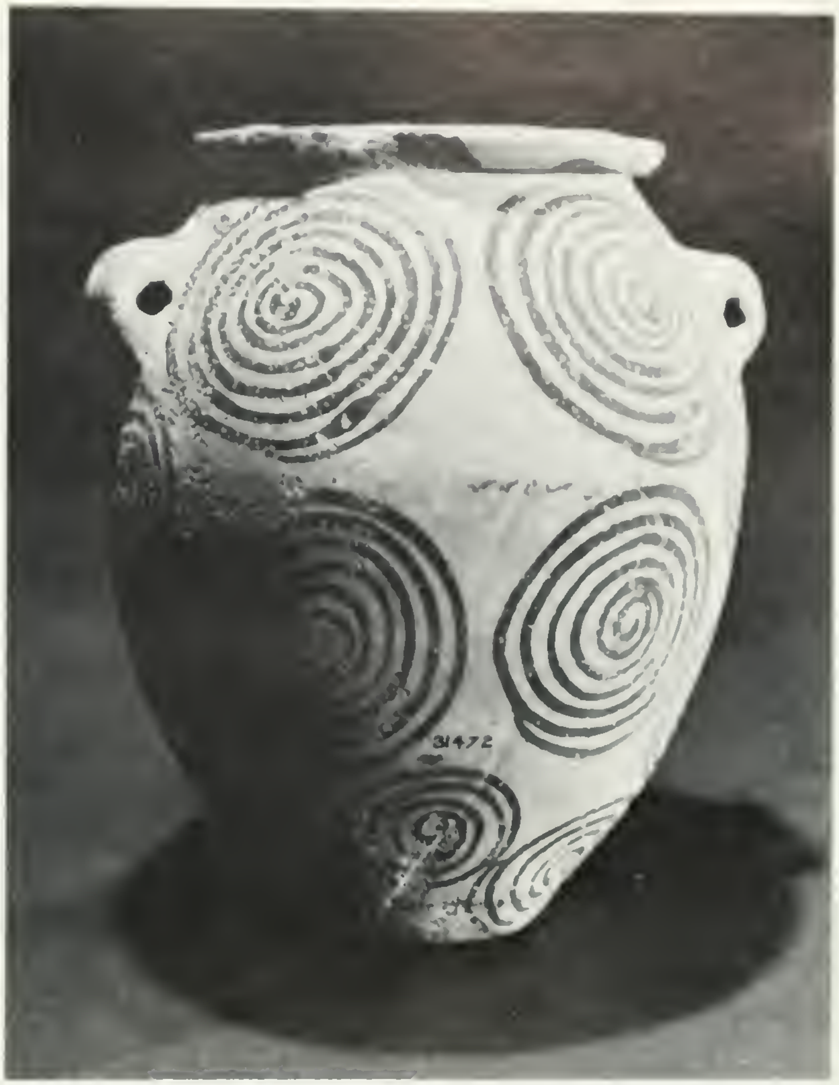
illustrated by the numerous thin-walled plates and bowls produced in the late predynastic and archaic periods. Vessels were occasionally produced with rims or bases cut from a separate piece of stone and fitted exactly to the body of the vessel.

While they are occasionally found in settlements, the majority of these vessels appear to have been made entirely for funerary purposes; as many as 40,000 were found in a single storeroom of the step pyramid at Saqqara.

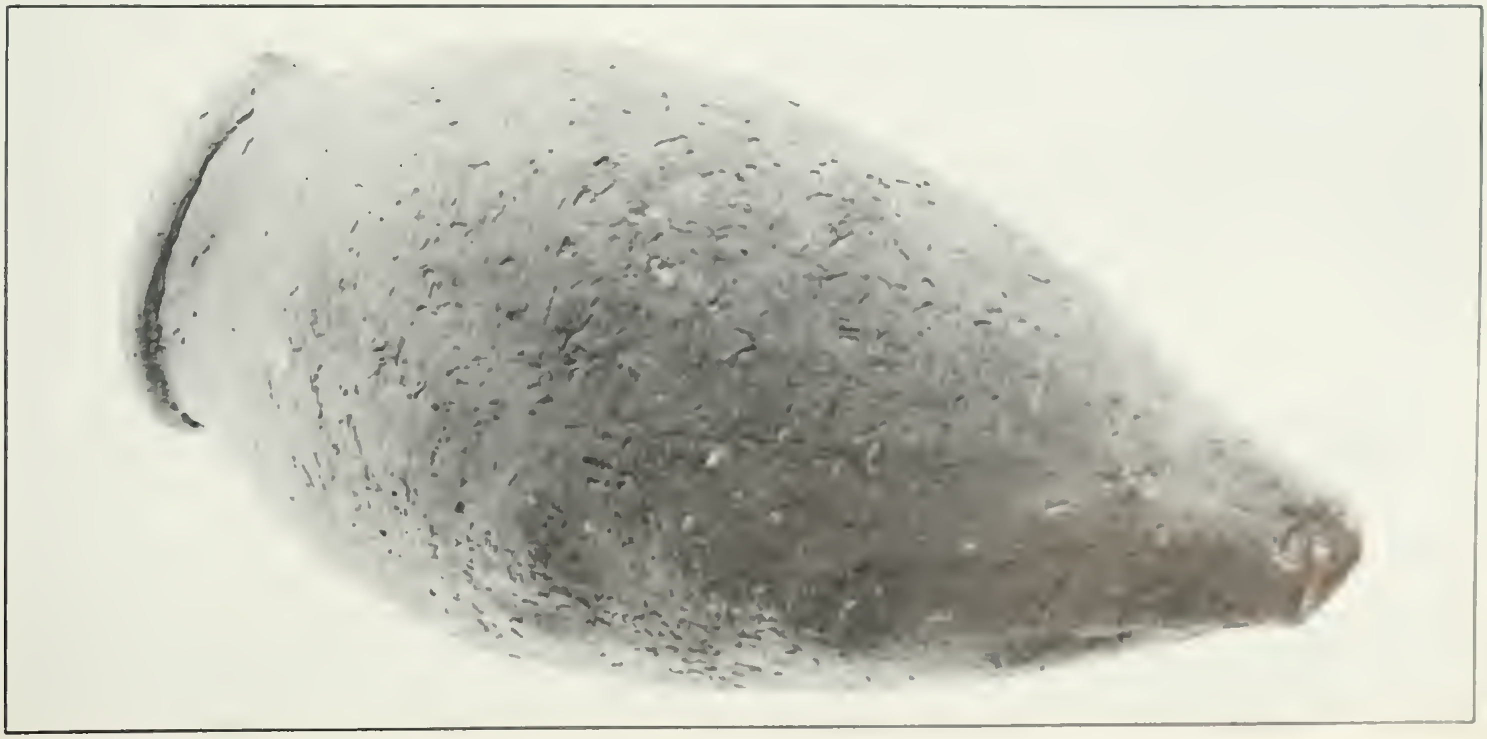
Not only were stone vases made specifically as grave goods, so were certain kinds of pottery and flint tools. The elaborate ritual surrounding burial in the predynastic period foreshadows the funerary customs of dynastic Egypt.

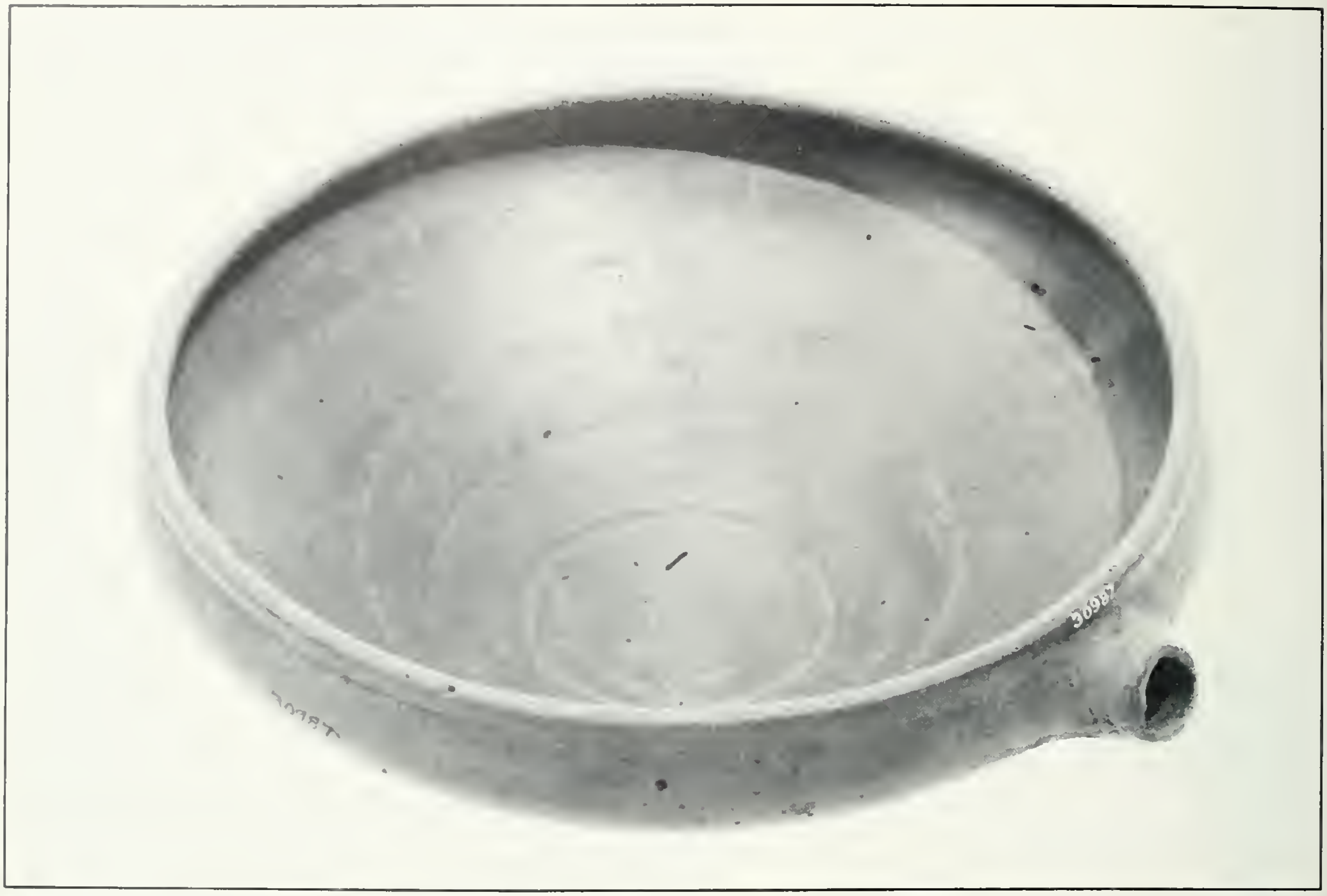
Jewelry, weapons, cosmetic palettes, animal and human figurines, and foodstuffs, as well as stone vessels and pottery, were often included in predynastic graves. The corpse was interred in a fetal position, most often on the left side and facing west; occasionally it was wrapped in a straw mat or a linen sheet and placed in an oval grave, which was then covered with a simple mound of earth and stones. Village cemeteries, as today, were usually located on the desert edge of the valley (fig. 12). Though remarkably well preserved, the bodies so interred were not mummified, and their condition is due entirely to the dryness of the climate and the dessicating sands of the desert.

Even after well over a century of excavation, we still know far less about how the ancient Egyptians lived than how they were buried. A few small villages of various periods have been discovered, but they are far from representative of what a floodplain town must have been like. Houses were built on a framework of posts against which mud plas-



**5.** *(Above) Buff ware jar with spiral design in red pigment Naqada II. Height 16.5 cm #31472* **6.** *(Below) rough straw-tempered ware vase with pointed base Naqada III Height 16.5 cm #31470*

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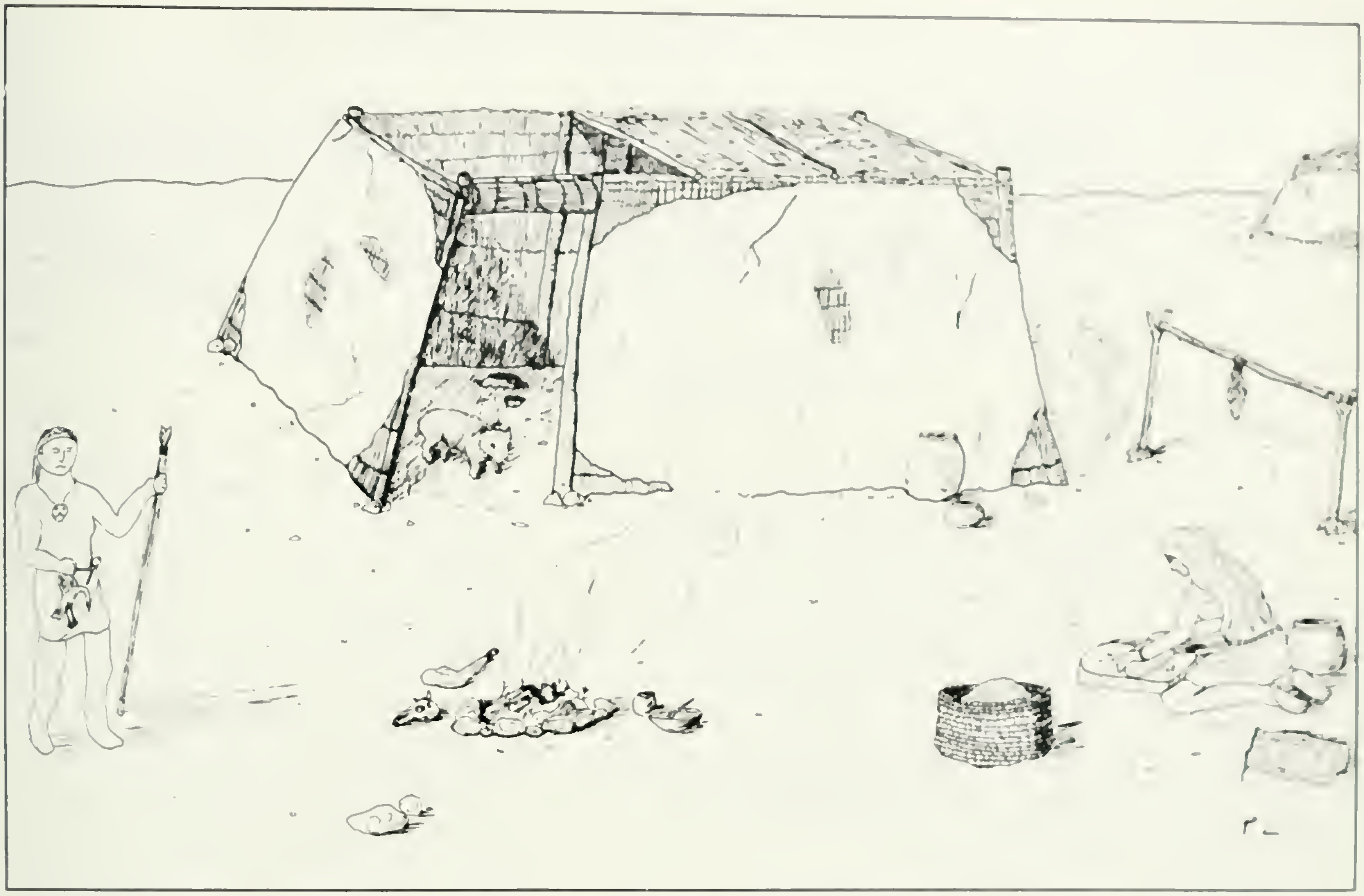
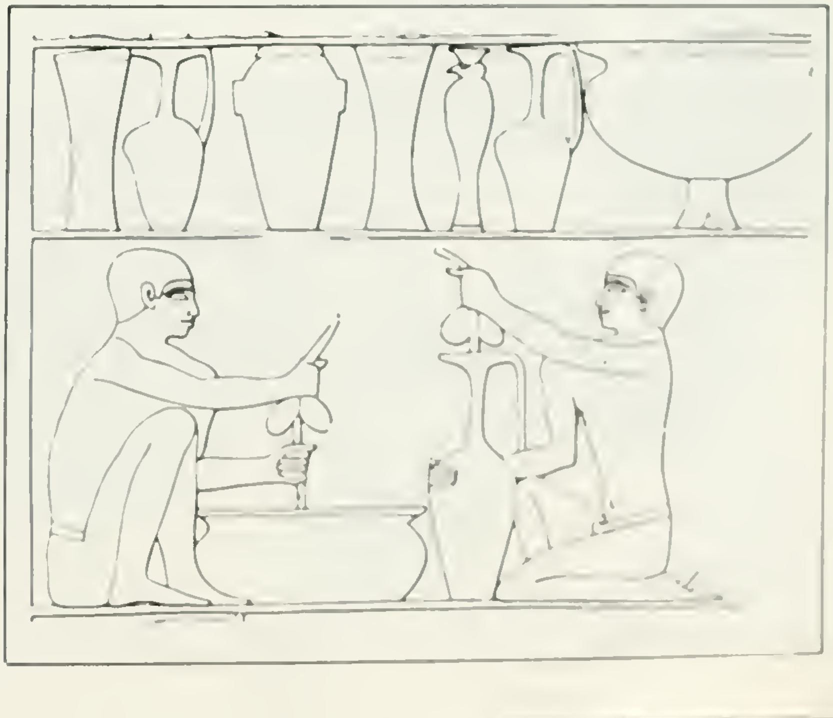


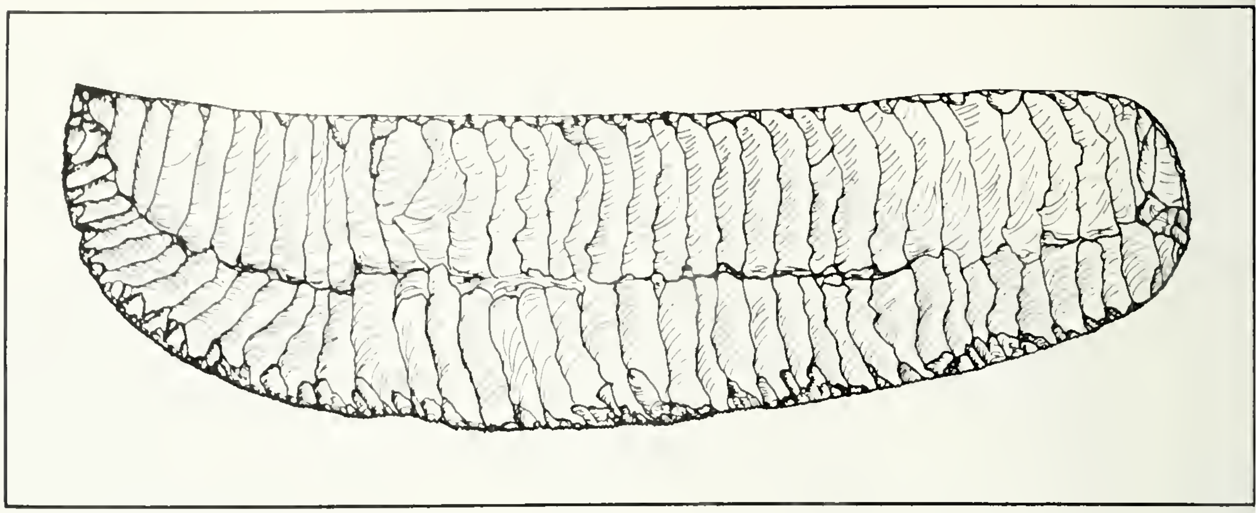
tered reed mats were set. These houses most often consisted of a single room with an open courtyard in front (fig. 9). Cooking and most domestic activities were conducted outside, with the interior of the hut reserved for sleeping and possibly animal keeping. More substantial structures of brick and timber have recently been uncovered at Hierakonpolis, the site of the largest surviving town of the predynastic period.

Most of these villages were agricultural, wheat and barley being the principal crops. Farming depended on the annual flooding of the Nile, which occurred from July to December. When the river retreated, the water left in low-lying areas provided for continued irrigation. Crops were harvested in the spring and seed grain was stored until the next winter planting. The soil was tilled with wooden hoes set with flint blades, and grain was harvested with wooden sickles set with serrated flint blades (fig. 8). Additional objects of flint included arrowheads of various types, adzes, knives, and even representations of birds and animals. The most impressive productions of the flint knapper's art were the beautifully ripple-flaked knives of the late predynastic period. These knives were chipped to roughly the desired shape and then ground smooth and serially pressure flaked along one side to form the rippled surface (fig. 11). That these knives were often set with gold or ivory handles indicates the high value placed upon them. Eventually the

**7.** *(Left, above) wheel-made redware spouted bowl. Old Kingdom. Height 10 cm. #30987.* **8.** *(Left, below, l. to r.) redware bowl, Naqada III, #288349, pottery jar with plant motif, #31473; flint sickle blade set in reconstructed haft, Fayum neolithic, #200423, buff-ware storage jar, Naqada III, #31483; flint hoe blade, Fayum neolithic, #219280.*

**9.** *(Above) Reconstruction of Predynastic wattle and daub house.* **10.** *(Below) Stone vase-making scene from the mastaba of Mereruka, Saqqara*





**11.** *Ripple flake flint knife, 3300-3150* B.C. *#30783.*

growing importance of metal tools eclipsed the chipped-stone industry, but flint tools continued to be made throughout much of dynastic Egypt.

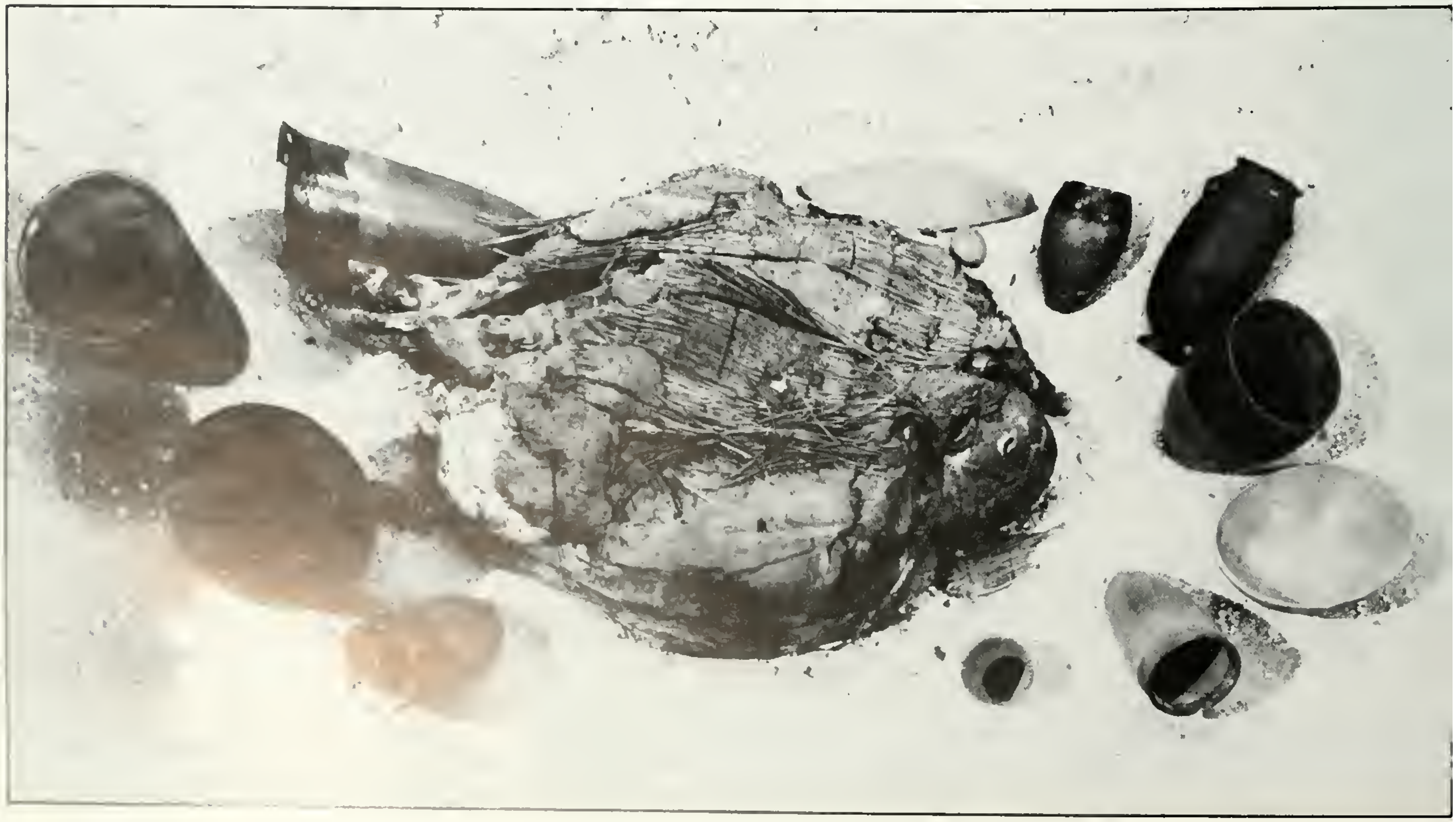
Cereals, used in bread and beer, were the mainstay of the Egyptian diet and supplemented with fruits and vegetables, both cultivated and wild. Cattle, pigs, sheep, and goats were domesticated, and fish and game were hunted in the marshes and in the desert. Analysis of the contents of the stomach of a predynastic Egyptian body has disclosed a last meal which included cereals, a rodent, and insects.

Besides farming, some predynastic towns engaged in trade and others became ceremonial centers. Larger settlements such as Abydos, Naqada, and Hierakonpolis must have exercised considerable influence, and indeed remained important religious centers throughout much of later Egyptian history.

Community leaders and elites were buried in increasingly larger and more richly furnished tombs, indicating growing social stratification. Associated with some of these individuals were symbols later connected with the kingship in pharaonic Egypt, as for example the falcon, the red crown of lower Egypt, found at Naqada; and the white crown of Upper Egypt, found at Hierakonpolis.

Eventually these groups were unified into a single state, probably by the pharaoh Narmer, who chose the area around modern Cairo for his new capital, Memphis. The founding of Memphis marks the end of the predynastic period, the beginning of written history in Egypt, and the creation of the dynastic state.

**12.** *Predynastic burial scene, reconstructed. This naturally dessicated "mummy" was purchased in Egypt by Edward E. Ayer and is here grouped with objects bought by Ayer and pottery excavated at Naqada by W.M.F. Petrie. The objects date to the beginning of the Naqada II period (ca. 3700* B.C.*) and represent what a moderately wealthy grave group would contain.*



# PAINTINGS FROM THE TOMB OF NAKHT AT THEBES

By Wiliam J. Murnane

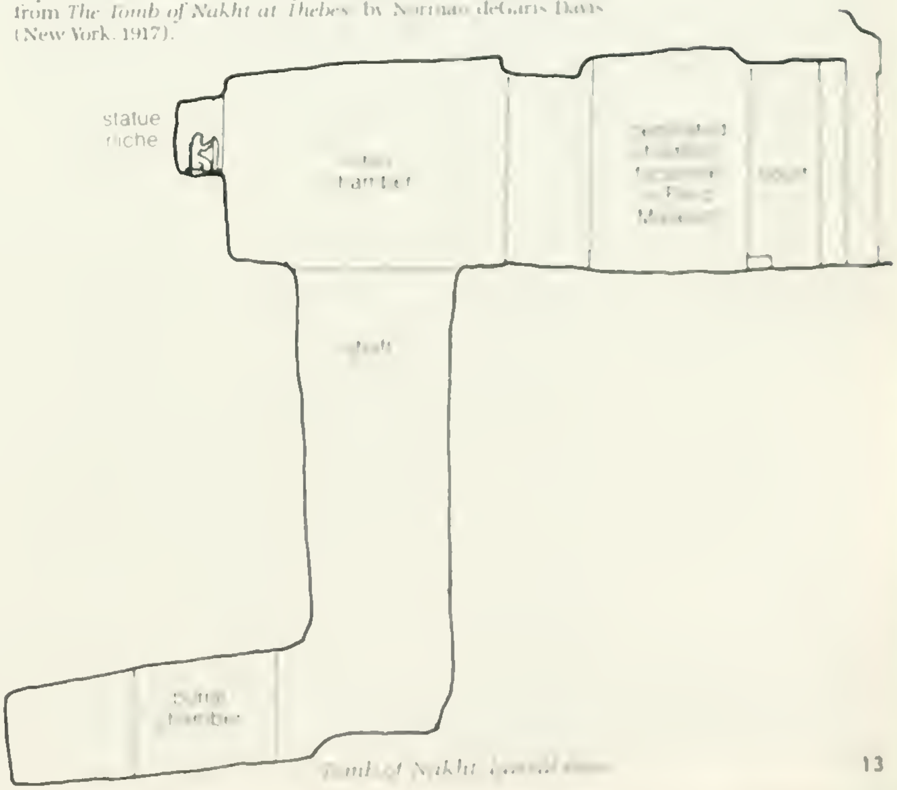
"*Beautify your house in the cemetery, enrich your place in the West.*" The ancient Egyptians' belief in the continuity of life after death is the basis for this advice: for even though they knew that "no one can return from there," they also believed that the next world could be enjoyed on terms similar to those of the good life of the deceased on earth. Decent burial after "a good old age" was the fitting capstone of a successful career. This meant that a great deal of attention went into the proper outfitting of a tomb—for after all, "the house of death is for life."

The earliest Egyptian burials had been simple pits in the desert, into which the corpse was placed along with a few personal possessions and a token offering of food. The ideas of personal survival that underlay these primitive measures were refined in the religious thought developed during the oldest historic periods. On the most basic level, the Egyptians believed in the resurrection of the body: mummification prevented the corpse's dissolution once it had been removed from the drying sands of the desert, and "reserve heads"—sculptured replicas—were kept in the tomb in case the deceased should lose his own.

The Egyptians had no exact equivalent to our belief in the duality of body and soul, but they believed in forces such as the *Ka*, a cosmic double, who came into existence at a person's birth and preserved the personality after death; and also in the *Ba*, a dynamic intermediary between the worlds of the dead and the living. Egyptians also came to believe that the dead became identified with Osiris, king of the Netherworld, and could thus share his power over the forces in the realm beyond death.

To ensure the well-being of these elements after death, the Egyptians also developed increasingly elaborate burial arrangements. Virtually any settlement in the Nile Valley would have its cemetery nearby, usually on the western side of the Nile: to the Egyptians, "the West" was synonymous with the land of the dead. High government officials, however, preferred to be buried near one of the centers of power—at Memphis, the capital, and later in Thebes, in Upper (southern) Egypt. During the Egyptian New Kingdom (*c.* 1570-1070 B.C.), burial in the Theban Necropolis brought with it the prestige, not only of being in the "estate" of Amun, who at this time was waxing into the most influential of Egypt's many gods, but also of being on the fringes of the Valley of the kings, where all the rulers of this period had their tombs.

The tomb of Nakht is a good example of one type of rock-cut tomb built at Thebes during the New Kingdom. Such tombs characteristically had three parts: an outer courtyard, where the last rites



*Tomb of Nakht,* [illegible]

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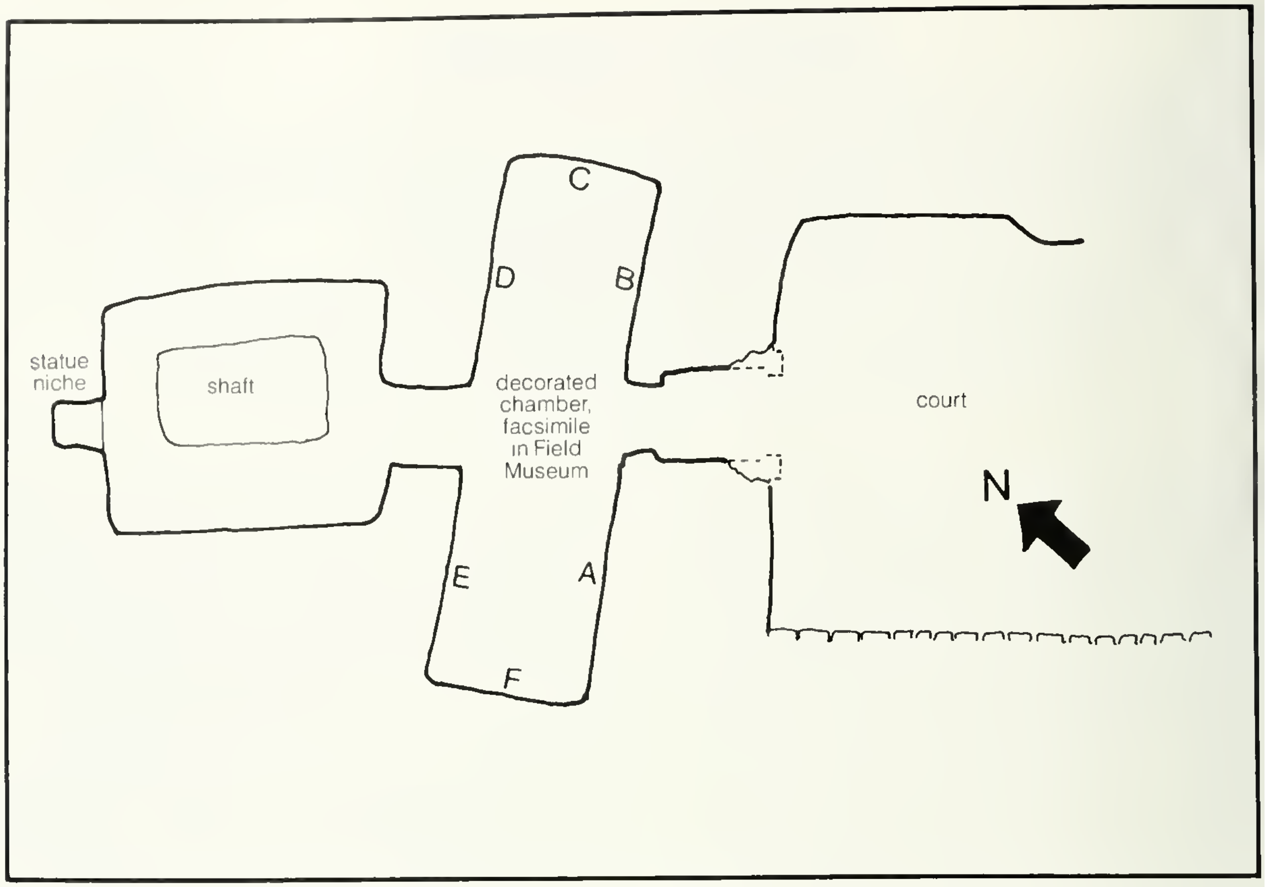
Reproductions of Nakht tomb paintings shown in this article are from *The Tomb of Nakht at Thebes* by Norman deGaris Davis (New York, 1917).



*Tomb of Nakht, vertical view. Letters in decorated chamber correspond to wall designations in text and illustrations of this article.*

were held; a chapel cut into the mountainside, consisting of a broad hall followed by a long corridor, with a statue of the tomb owner placed in a niche or in another small room at the far end; and, deep underground, a burial chamber, reached by a shaft dug into the floor of the court or branching off from somewhere inside the chapel. Scenes, inscriptions, and patterned decorations could be carved directly onto the walls; but (as in the tomb of Nakht) the decorators often preferred to coat the walls with plaster and complete the decoration in paint.

The paintings that survive in the tomb of Nakht all come from the broad hall of his chapel; the other parts of his tomb were left unfinished. Themes such as the offering bearers who wait on the deceased, and his stela at the right end of the tomb (wall *F*) lay predictable stress on his mortuary cult. Many other scenes, however, portray Nakht in the full vigor of life, watching the workers on his estate at the grain harvest (wall *A*), fishing and fowling in the marshes (wall *D*), and attending a banquet (wall *E*).

To interpret these scenes merely as reflecting [illegible] class would be misleading. [illegible] accurately viewed as the tomb [illegible] systems" which, by evoking [illegible] magically ensure that the de[illegible] "live on" in his next life, that he would triumph over adverse forces found there, and continue to be remembered on earth. Such "scenes of daily life" are often as picturesque to us as they are informative; but they were as vital to the tomb owner's survival as the religious and funerary subjects usually found in the inner corridor of similar tombs.

Nakht himself was not one of the great luminaries of his age. His sole claim to fame lies in the exquisite decoration of his tomb; and it is on the basis of these paintings' style that he is believed to have lived during the reigns of Amenhotep II (*c.* 1453-1419 B.C.) or Thutmose IV (*c.* 1419-1386 B.C.), during the Eighteenth Dynasty. His occupation, on the other hand, sets him apart from the other priests and government functionaries buried in the Theban Necropolis, for he was an astronomer—or, to translate his title more precisely, an "hour man," someone trained to observe the movements of the sun, moon, and stars and to schedule from this data the divine festivals the occurrence of which depended on these heavenly bodies.

The other title he employs in his tomb, that of "scribe," could be claimed by anyone who was literate; but his full service title, "astronomer of Amun," suggests that he was on the staff of the great temple of Amun at Karnak, across the river, as was his wife Tawy who, along with many other officials' wives of her class, was a "chantress of

Amun." Tawy's marriage to Nakht may have been at least her second, for one of the offering bearers in the banquet scene (wall *E*) is described as "her son, Amenōpe." For the rest, we know nothing about these people: they live as they wished to be immortalized, through the paintings in their tomb.

The tomb of Nakht (number 52 in the non-royal necropolis at Thebes) is located on an outcropping of the Theban hills known as Sheikh Abd-el-Qurna. Even though more than thirty-three centuries have passed since completion of the paintings, they are in remarkably fine condition. Some damage was done to them near the end of the Eighteenth Dynasty (*c.* 1346-1334 B.C.), when agents of the heretic pharaoh Akhenaten entered the tomb and erased the names of Amun, sometimes destroying those of Nakht and his wife as well. Other areas of painted plaster have flaked off since then, most seriously in the banquet scene (wall *E*). Otherwise, the scenes remain intact, with the colors seemingly as fresh as when they were first painted.

The tomb was discovered in or shortly before 1889; and it was copied for publication in 1915 by Norman DeGaris Davies and his wife, Nina, who later made the facsimile model for the Metropolitan Museum of Art, which is now on exhibit at Field Museum. Today, the tomb of Nakht, in Egypt, is one of the most frequently visited of all the Theban tombs. Visitors to the Field Museum who have not been to Egypt may now view this full-size copy with the assurance that it faithfully reproduces the designs and brilliant coloring of the original monument.

In the descriptions that follow, directions (left, right) and references to the various walls (*A-F*) are made in terms of the diagram on page 14. In the translations given here, lost or damaged words are restored in brackets.

## Wall A

This wall, divided into two registers of unequal height, falls also into two separate scenes—that of the deceased, with his wife, offering to the sun god (not reproduced here); and the agricultural vignettes, shown on the following page.

In *the offering scene*, Nakht stands before a pile of offerings, onto which he pours the contents of a jar of oil. Four more jars rest on a mat on the upper left, with a bouquet draped gracefully over each one. Varieties of food are stacked below—vegetables (onions, baskets of fruit and flowers) predominate on top; cuts of meat and dressed fowl in the middle; and several types of bread on the bottom. A pair of butchers are still working on the carcass of a bull at the bottom right, while a third man offers a cup with two cones of fat to the deceased. Behind Nakht stands Tawy, his wife, her hair bound with a chaplet of flowers. In her right hand, held against her chest, she holds a necklace with its oblong counterweight; in her left hand, hanging at her side, is a rattle: both objects, besides being sacred to the "mistress of the Western Mountain," Hathor, were employed in the course of Tawy's service at the temple. The eleven columns of hieroglyphs above the figures' heads describe the occasion as an "offering of every sort of good and pure thing—bread, beer, oxen, fowl, long- and short-horned cattle—thrown (?) upon the brazier to [Amun-Rē . . . ; to ] Rē-Horus the Horizon-dweller; to Osiris the Great God; to Hathor, chieftainess of the desert; (and) to Anubis on his mountain, by the astronomer of [Amun, the scri]be of Nak[ht, the triumph]*ant*;* (and by) his sister,** his favorite beloved, the chantress of [Amun, Tawy], the triumphant."

*Wall D detail*

Notice that, both here and in the corresponding spot on wall *B*, Nakht and his wife face the doorway. This is a regular feature in the Theban tombs and expresses the hope of the deceased that they might rise every day after death to bask in the life-giving rays of the sun. Note also the patterned decoration that runs along the top of the wall: these ornaments, called *kheker*u, represent wisps of straw projecting from the top of the mud-daubed frame of a primitive house and bound together for decorative effect. Found in domestic architecture from earliest times, this feature was retained as an ornamental motif in stone buildings down to the end of ancient Egyptian civilization.

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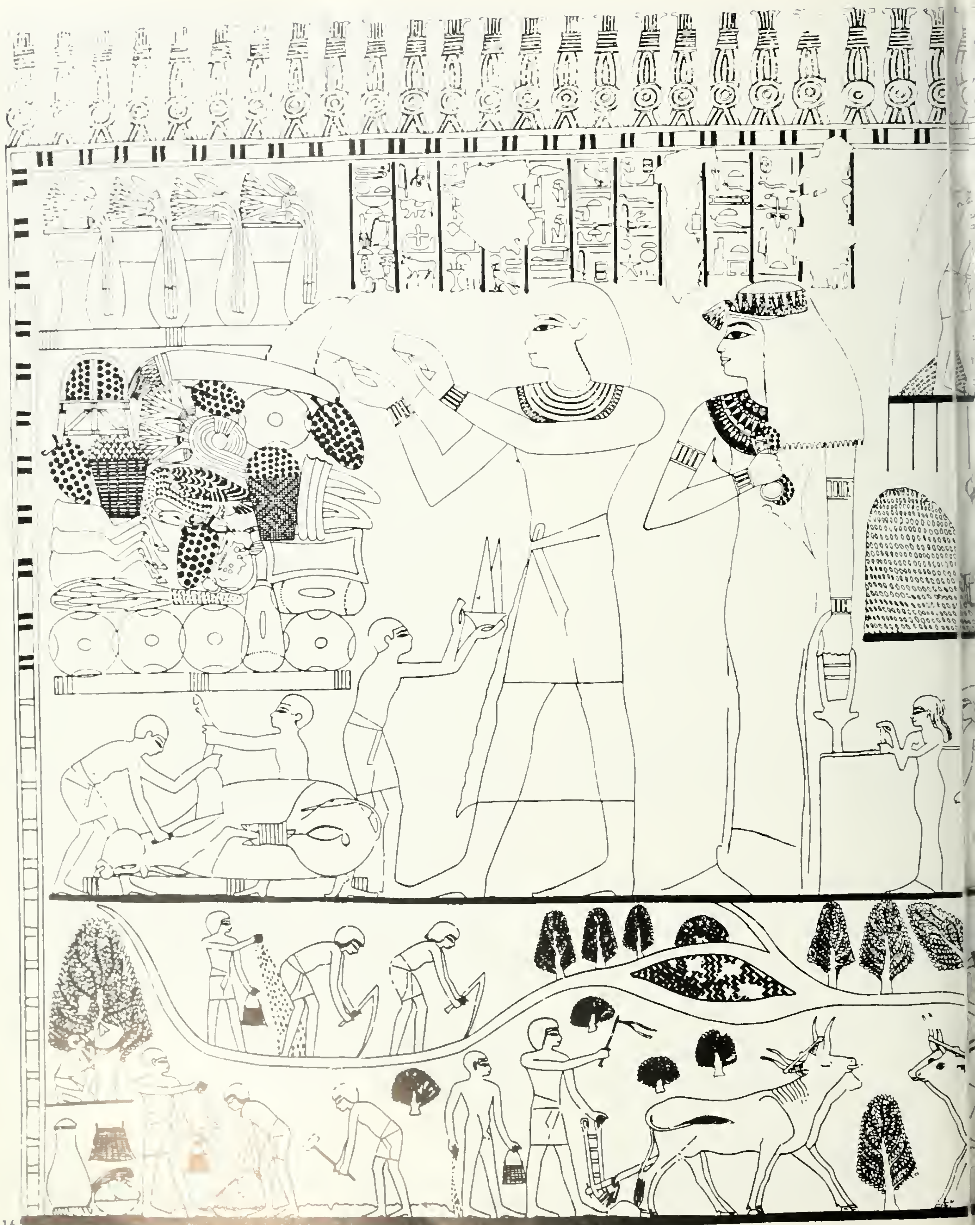
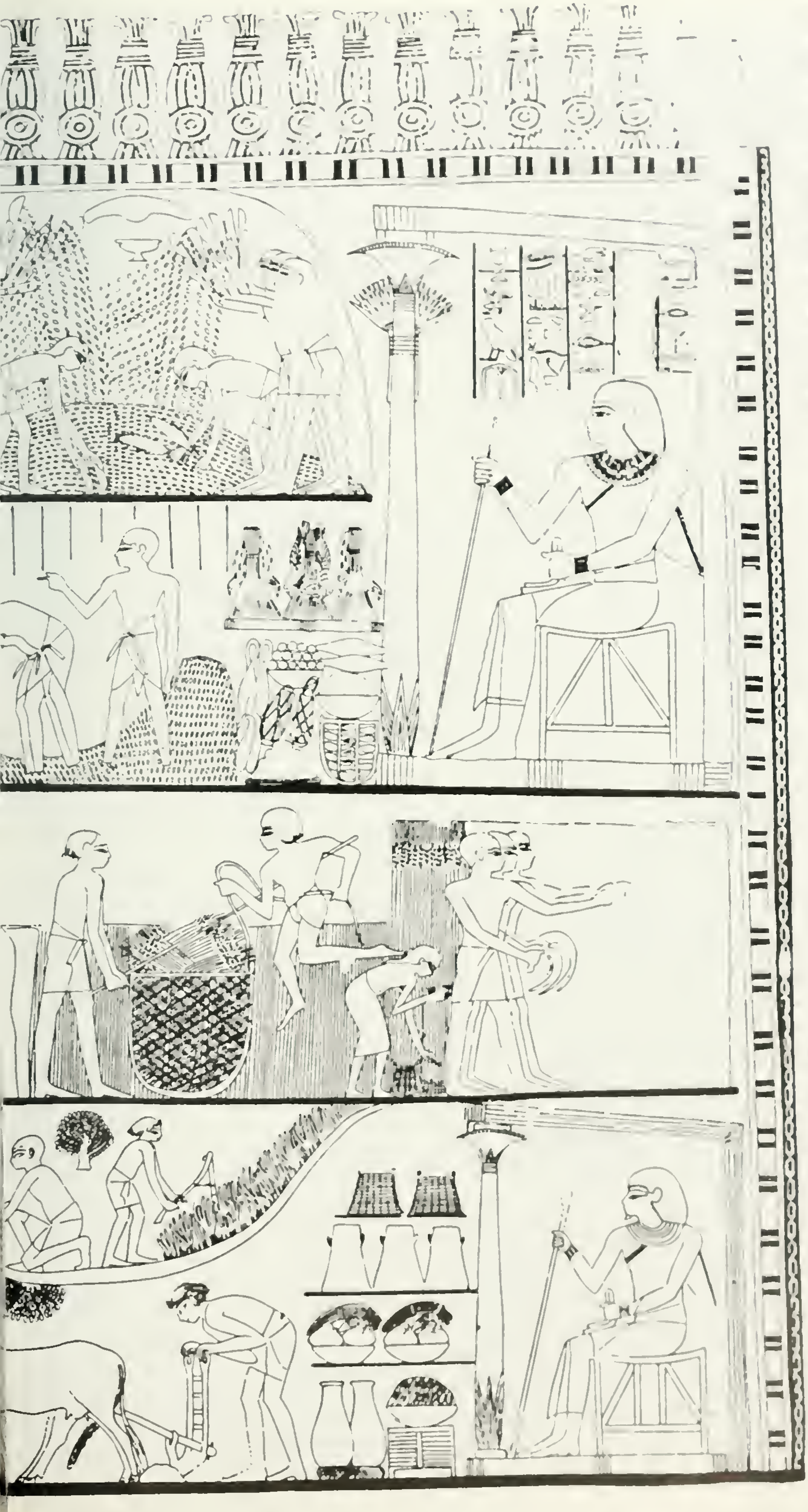
*An expression that regularly follows the deceased's name, indicating that he or she has been cleared of any wrongdoing by the divine tribunal in the Underworld.*

***An affectionate synonym, here meaning "wife."*



WALL A



**The Agricultural Scenes:** [illegible] which were placed in the tomb to ensure [illegible] the deceased a steady source of food in the next world, constitute the most [illegible] of a farmer's life in ancient Egypt. The sequence begins on the lowest register [illegible] breaking up the land and earth with [illegible] since the annual Nile flood has receded. Other laborers are [illegible] the prepared fields with [illegible] ploughing them with the help of [illegible] others scatter seed into the furrows. Reserve bags of seed are placed at the sides of the fields *(left and right)* along with the worker's lunch: baskets of food and tall jars of water; the latter, like water jars used in Egypt today, are mounted on stands and, being made of a porous clay, allow some evaporation of the contents through the sides of the jar, leaving the remainder cool. Much the same effect is produced by the skin water bag hanging from a tree, from which we see a man drinking at the far left.

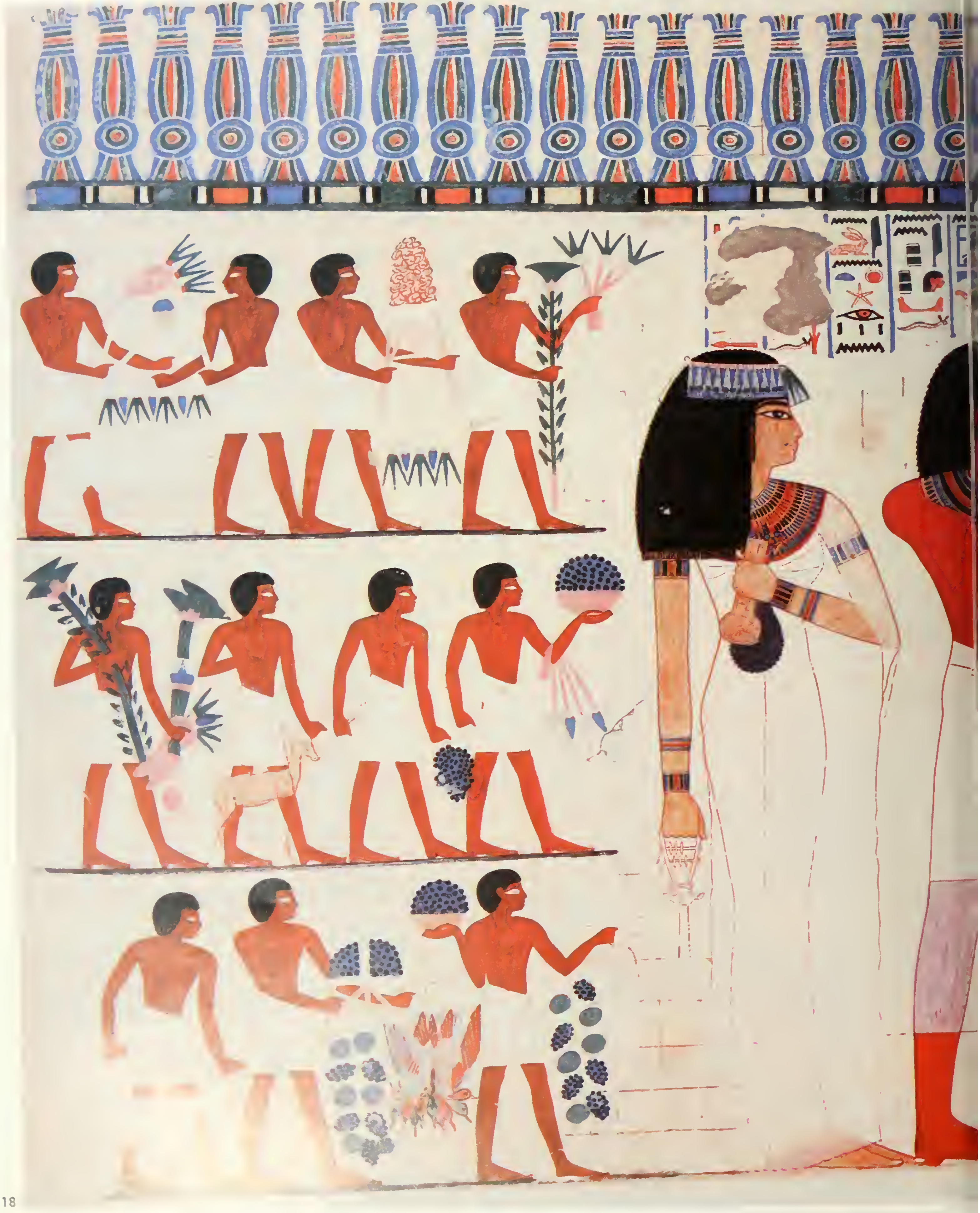
The sequence next moves up through the three subregisters on the upper right side. In the lowest of these, two young women move through fields of green flax *(left)*, pulling up the stalks for bundling. The heavier work of harvesting grain is done by men with sickles *(right)*, followed by a woman who bends low to glean the broken stalks they have thrown aside.

In the middle of this row the grain is packed into a large basket: the man on the right holds the end of a staff which his partner on the right uses to cram down the sheaves, jumping up and bearing down on it with his full weight while at the same time pulling on a drawrope. The artist's gift for fine detail is seen in his treatment of the standing fields of grain and his distaste for this boring work is evident from the unfinished state of the grain and flax on the right and left ends of this row.

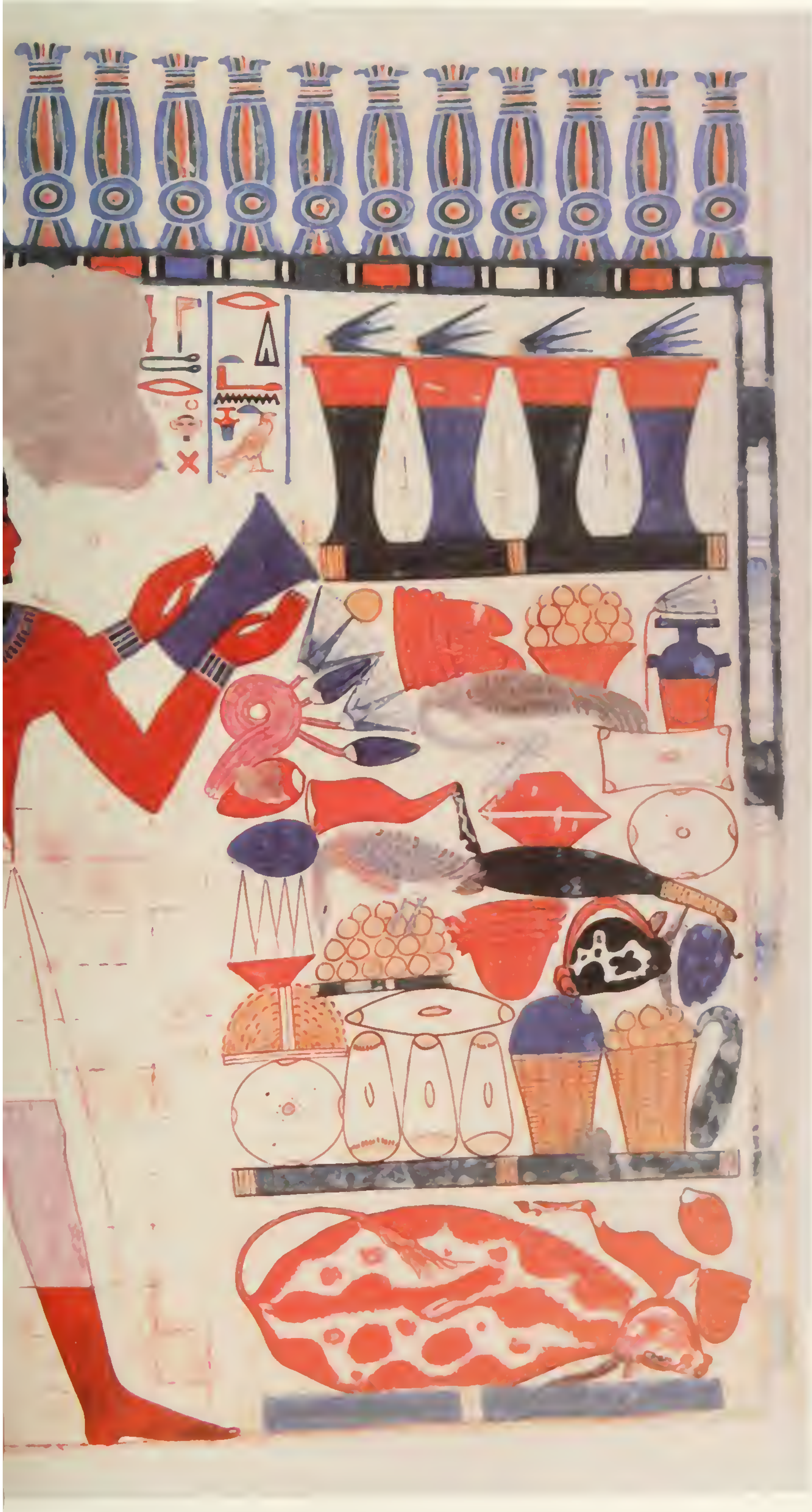
The next stage, separating the ears from the stalks, is not shown here, but we do see the winnowing that followed in the upper row. Here, young women toss the ears into the air with wooden scoops, allowing the breeze to carry away the chaff and leaving the grain itself behind. One girl, on the left, is bending down to refill her scoops, while a companion keeps the pile together with two small hand brooms.

The hot, dusty work is wonderfully evoked by the clouds of grain and the attitude of the young women, one of whom has bound her hair with a kerchief against the chaff in the air. The muddy brown background is the threshing floor on which this activity took place, and the two objects seen at the upper middle — a bowl, and what may be a straw doll, daubed with mud — are interpreted as offerings to Renenutet, the serpent goddess who protected the harvest by eating rodents and other potential hazards to the grain crop.

The final episode is in the middle row: two men measure out the grain with wooden buckets supervised by a scribe. These [illegible] ments were never painted into the [illegible] prepared for them. The figure of the [illegible]



WALL B

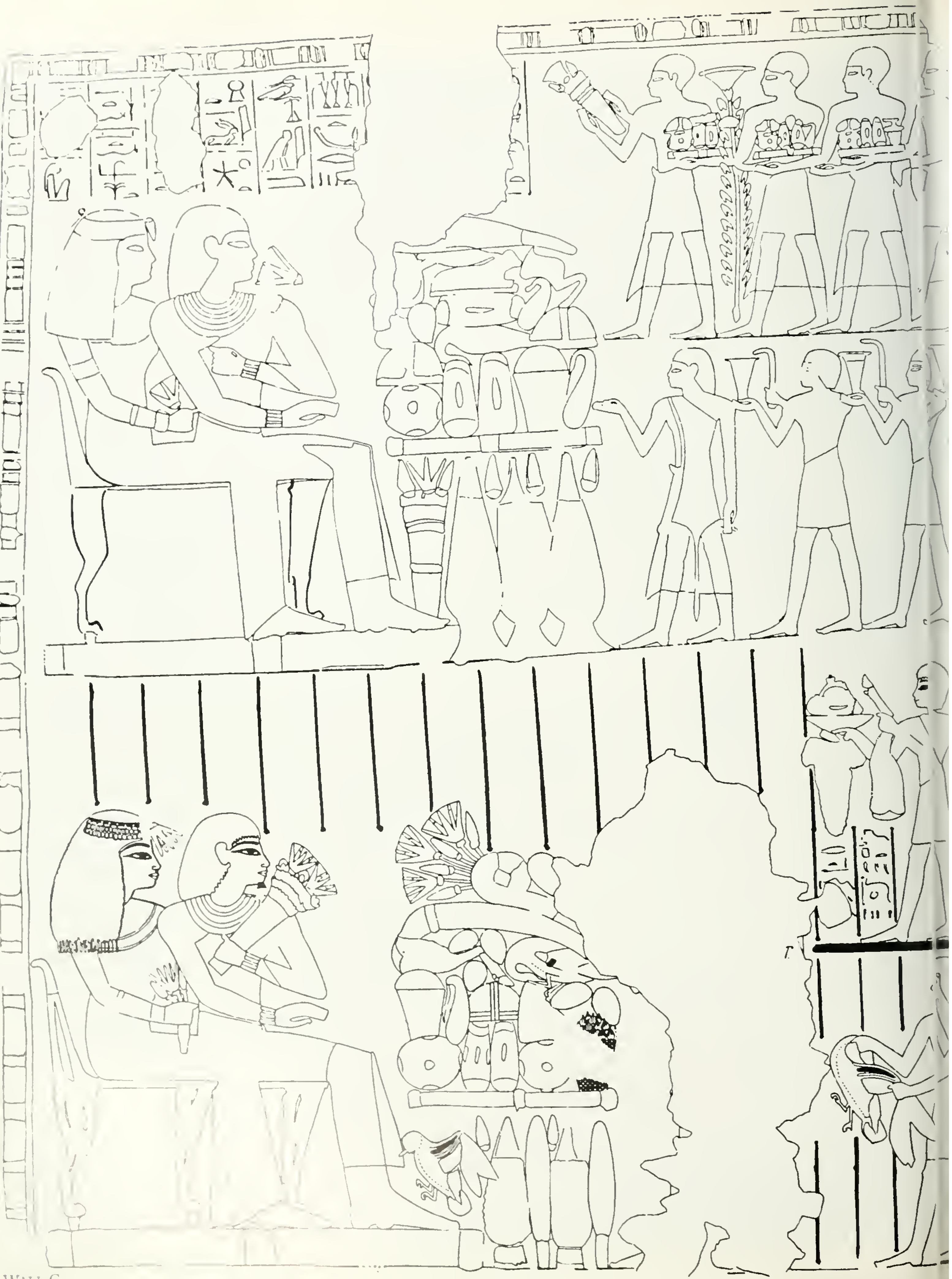


are then piled before the tomb owner, who appears here, along the lower register, "seated in a booth, watching the fields."

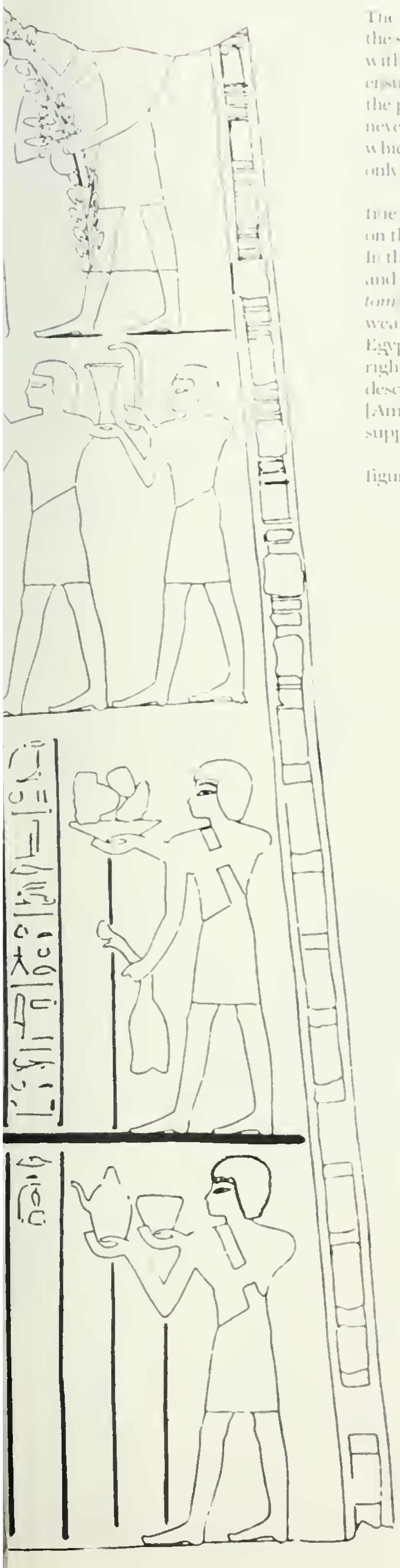
## Wall B

Here, at left, as on *wall A*, Nakht and Tawy face the outer world and offer sacrifice to the gods. The texts above their heads speak of "giving myrrh and incense in the flame" to the same divinities named on the opposite side, but this is belied by the profusion of offerings shown on the right. Many of the items of bread, meat, and vegetables will be familiar from *wall A*, but the menu here is more varied: note in particular the dressed crane and the head of romaine lettuce in the middle row.

What appears, at first glance, to be an elaborately colored fish just beneath the lettuce is in fact a painted bull's head. Additional offerings are brought in by the three rows of bearers behind Nakht and Tawy, entering from the left. One more notable feature in this scene is the preservation of the grid, drawn on the wall in red paint before the figures were first drawn in rough draft and still surviving after the final painting of the entire scene.



WALL C



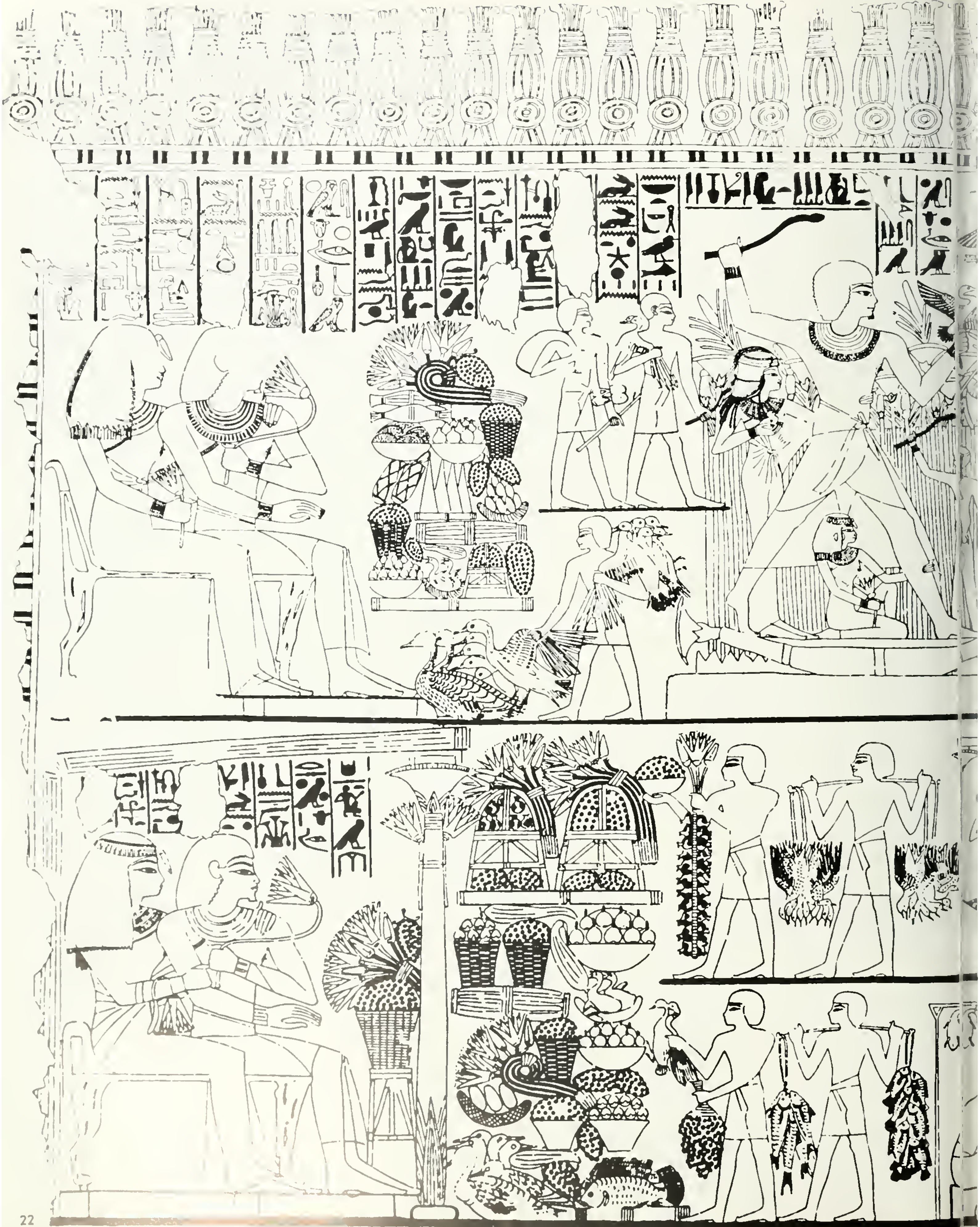
## Wall C

The two registers shown here depict variations of the same theme: the deceased and his wife, seated within the tomb, receive offerings from the living to ensure their continued well-being. In contrast with the previous two walls, the paintings here were never finished. This is mostly true for the texts, which, when they are present at all, were drawn only in outline and not filled in.

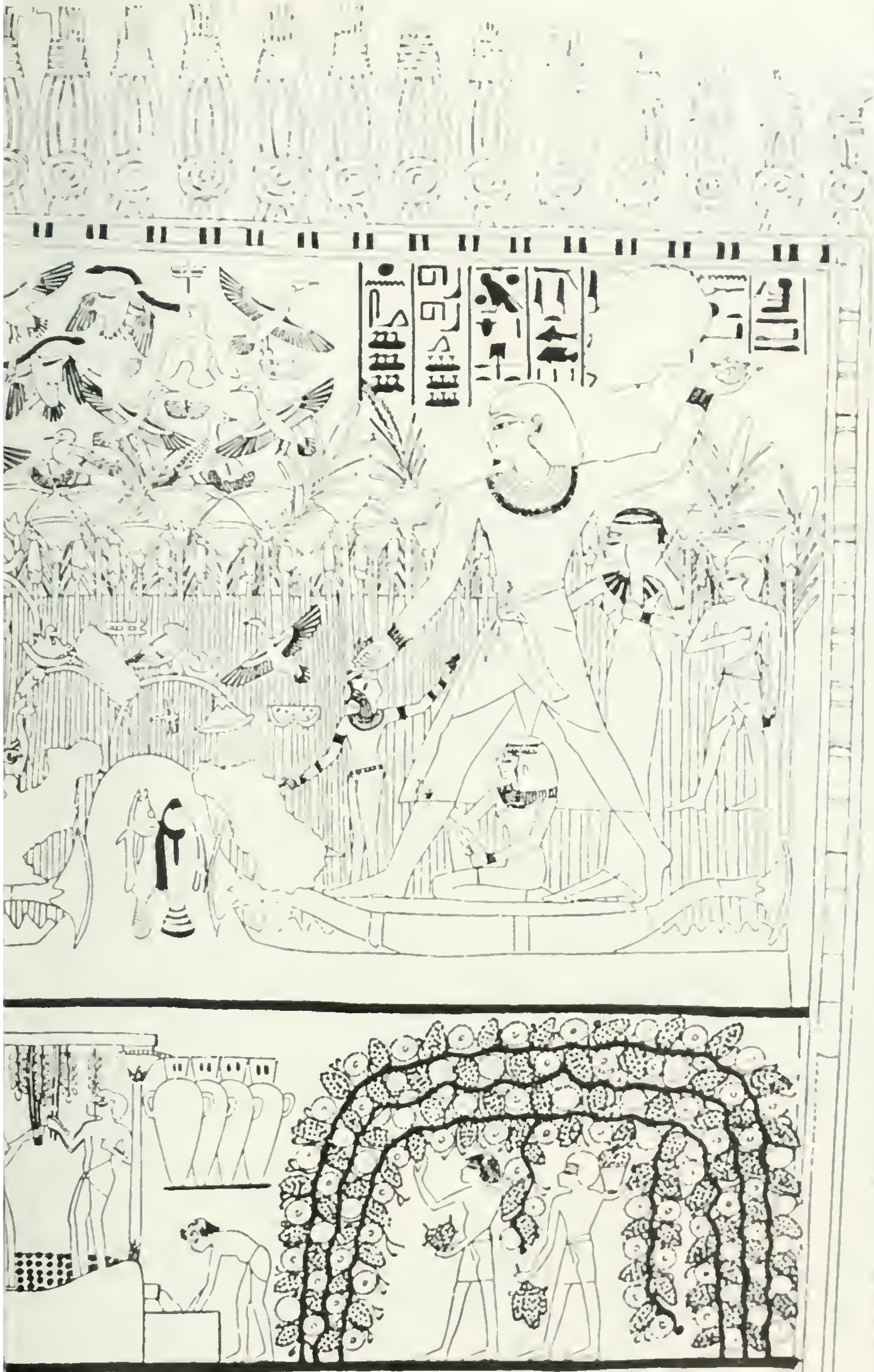
Most of the figures were finished in paint, but fine details on the offerings and much of the couple on the upper left side were never completely done. In the upper register, two rows of men bring in food and bouquets (*top*) and jars of oil with wicks (*bottom*). This lower group is led by the *Sem* priest, wearing a leopard-skin, who regularly presided at Egyptian funerals and is seen here stretching out his right hand and uttering a spell. Nakht and Tawy are described as "rec[eiv]ing g[i]ft[s] of ... with which [Amun], pre-eminent among the holy ones, is well supplied during the course of every day."

In the lower register, the more conspicuous figure of the *Sem* priest was destroyed by agents of Akhenaten, perhaps because [illegible] himself [illegible] between the living and the gods. In this register, the upper row of [illegible] and decoration of [illegible] which comes from [illegible] "Be pure, be pure" — said [illegible] the Master [illegible] Astronomer of Amun, Nakht." The men in the lower row are seen carrying [illegible] food and drinks [illegible] but [illegible] fully drawn, and they are [illegible] from the rest of the register.

The tomb owner and his wife are shown at the left end of each register. On top, Nakht sniffs a flower (incompletely drawn [illegible]); below he holds a bouquet, perhaps a punning reference to the similarity in the words for "bouquet" and "life," both written *ankh*. It is possible that these offering processions represent the annual Feast of the Valley, during which the deceased's relatives visited the tomb and presented the tomb owner's statue with the bouquet of Amun. A similar practice, adapted to the Moslem religion, survives in Egypt to this day.



WALL D



## Wall D

[illegible]

The [illegible] Delta [illegible] the [illegible] Delta [illegible] the upper [illegible] earth. At the same time, the Egyptians' [illegible] for [illegible] Egypt [illegible] prosperity [illegible] full exploitation of the annual Nile flood.

The Delta, with its untamed wide open spaces, was also a threatening place where the powers of chaos held sway. The [illegible] represented a victory over the adverse forces the deceased might meet in the next world. Moreover, the channelling of potentially destructive elements into constructive paths was an expression of Maat: the cosmic harmony that was seen as the ideal condition of the universe.

*Fishing and fowling in the marshes* is shown in the upper register in two representations that are mirror-images of one another. Nakht stands in a reed skiff. Members of his family hold him upright by grasping his legs and midsection as he spears fish (*right*) and wields, along with his son, a boomerang against the startled birds who rise in a cloud from the dense thickets of reeds and papyrus stalks (*left*). The artist who painted this scene neglected to draw in the harpoon on the right, but two fish are nevertheless seen being lifted from the water between the two boats, while the text at the upper right speaks of Nakht's "penetrating the pools and traversing the marshes, amusing himself [and] spearing fish."

Above the scene on the left, the deceased is "amusing himself, watching pleasant things [and] practicing field sports, consisting of the work of the Marsh Goddess, by the companion of the Lady of the Fish and Fowl catch, the Astronomer of [Amun] [illegible] the scribe Nakht, the triumphant, and his wife, the chantress of [Amun], the lady of the house, Tawy. She says: 'Amuse yourself with the work of the Marsh Goddess! [illegible] the marsh bird, the moment is appointed for him!'"

The day's catch is gathered up by the servants on the right—note one of them with his sandals strapped to his arm—and brought before the two tomb owners, who appear seated at the left end of the register, "amusing themselves [and] watching pleasant things consisting of the produce of the marshes of Lower Egypt." [illegible]

[illegible]

iconoclasts' wrath onto it as well.

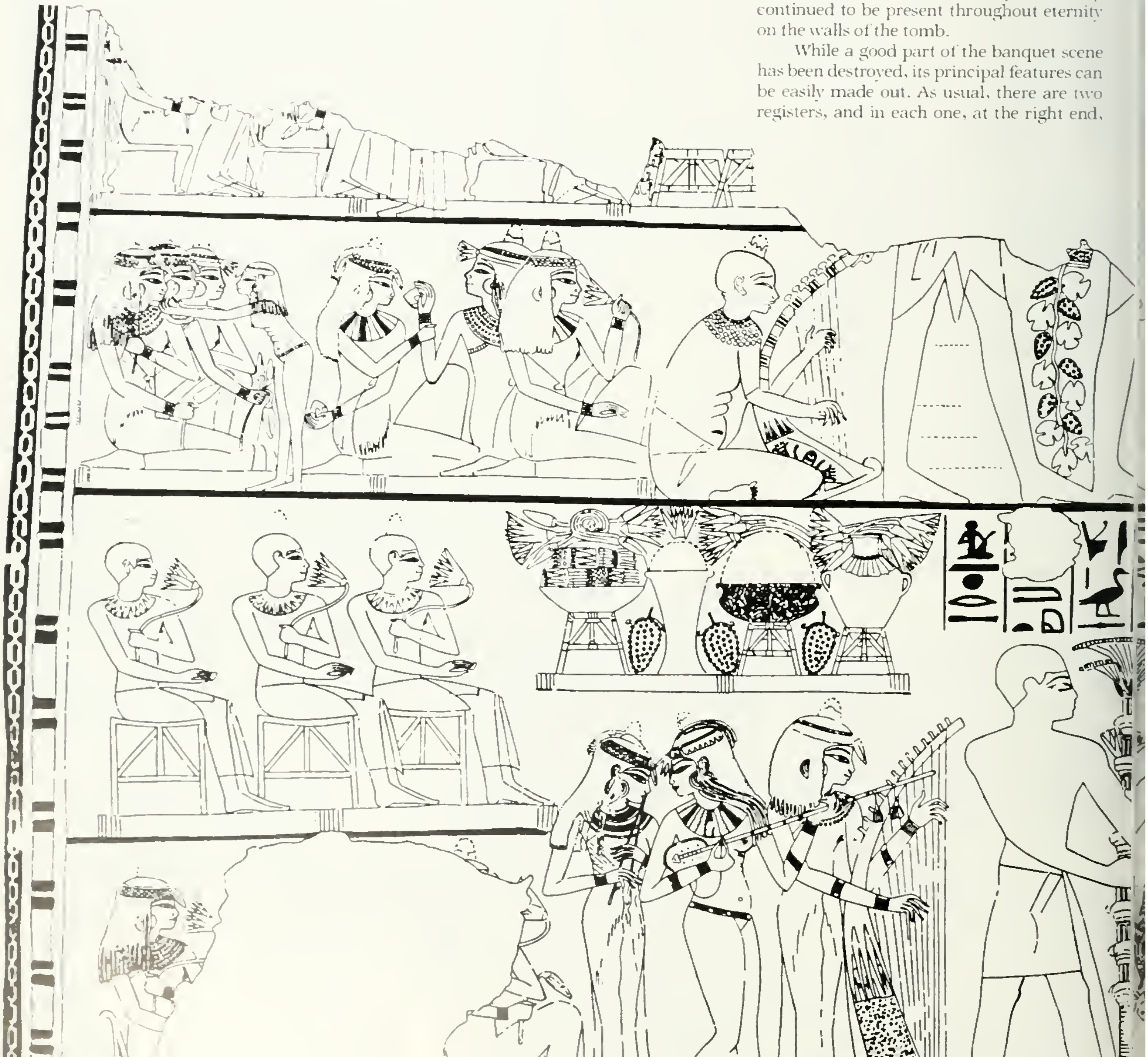
*Trapping birds in the swamp* can be seen at the bottom right side of the lower register: a man, who had hidden nearby, signals his partners to draw shut a net placed in one of the birds' favorite pools. The Egyptians preferred to domesticate birds that survived capture in this way, but the less fortunate victims are seen being plucked and gutted on the left. Above this we see two episodes of *viticulture*: an elderly vintner, accompanied by his younger assistant, selects the best bunches of grapes for wine-making and then supervises the treading of the grapes on the left.

The final outcome of the process is suggested by the four jugs of wine, already with their sealed clay stoppers, above the master vintner's head. At the opposite end, as in the register above, we see Nakht and his lady "seated in a kiosk in order to watch the pleasant things of Lower Egypt."

## Wall E

One of the final rituals at the tomb was the funeral banquet. To the Egyptians, the continuing close ties between the living and the dead was not only healthy but necessary: only thus would the family keep a sense of its historic identity, reinforced by the yearly visits to the tombs during the Feast of the Valley and by the upkeep of the family mortuary cults. It was for this purpose that the deceased "shared" a final meal with their families, and this was also why the family continued to be present throughout eternity on the walls of the tomb.

While a good part of the banquet scene has been destroyed, its principal features can be easily made out. As usual, there are two registers, and in each one, at the right end,



are Nakht and his wife. The deceased are shown as being already in their tomb: it is no accident that here, as well as on *walls C and F*, they are placed as close as possible to the door leading into the inner corridor.

In the upper register they were served by two men, probably carrying trays of food, from which vine streamers hung. On the bottom, an offering of food and "a bouquet, after doing what is praised" is made by a man who is described as "her son, Amenemope, the triumphant"—perhaps, as we have suggested already, Tawy's son by a previous marriage. An intimate detail is supplied by the tomb owners' pet cat, who occupies its customary place under their chairs and is seen devouring, with the ferocious single-mindedness of its kind, a fish.

The other guests—friends and members of the family—are seated on the left, facing the tomb owners. The more important guests are seated on chairs, with the others (*second row*) squatting comfortably on mats. Women seem to outnumber men in this family gathering: only three of the deceased's male relatives can be detected with any certainty (*third row*). The guests are waited on by servants, such as the practically nude young woman who adjusts one of the ladies' earrings (*second row*). The women wear long braided wigs, and both sexes are outfitted with collars. Nearly all the guests hold flowers, and everyone at the party wears on his or her head a cone of scented fat that was supposed to anoint the wearer as it melted.

Supplies for the guests' enjoyment are seen in the large jugs of liquid refreshment, ornamented with vine leaves (*top row*); and in the additional fillets for the guests' hair and further supplies of ointment (*third row*).

The picturesqueness of the scene is heightened by the musicians, who quite appropriately occupy the center of attention: the blind harpist (*second row*), a frequent participant in similar scenes from other tombs, squats with his feet tucked under his legs and sings for the guests. He is accompanied by three other performers, lithe young women, who play on a tall standing harp, a lute, and a double-reed pipe: note the sense of movement given to the almost nude lutist, as she turns (practically facing the viewer, in defiance of the customary practice in Egyptian art) to whisper something to her companion. It is a pity that the whole scene is not better preserved. Even so, it stands as one of the masterpieces of ancient Egyptian art.

## Wall F

The bottom register, not shown here, dominated by a pile of offerings, is presided over by the Tree Goddess, a female figure who symbolized the Egyptian's hope for nourishment in the arid cemetery area at the desert's edge. Behind her are two human offering bearers, while above them are other figures who kneel as they present bread, water, and ointment, or beer, milk, and linen—the necessities of life—and utter spells: "You are pure as Horus is pure! You are pure as Seth is pure!" The object of their devotion is a tablet, painted a mottled purplish-grey to simulate granite. This is the tomb owner's stela, his "false door" to and from the next world. It was from here that the *Ba* came on his errands to the land of the living, and it was here that the family served the tomb owner's mortuary cult. The door's "lintel," in the middle of the tablet, is covered with magical emblems—"the Wedjat"-eye for wholeness (particularly important for the mummy); the circle, symbolizing the eternal passage of the sun; and the cup of water, vital for the deceased's survival in the cemetery.

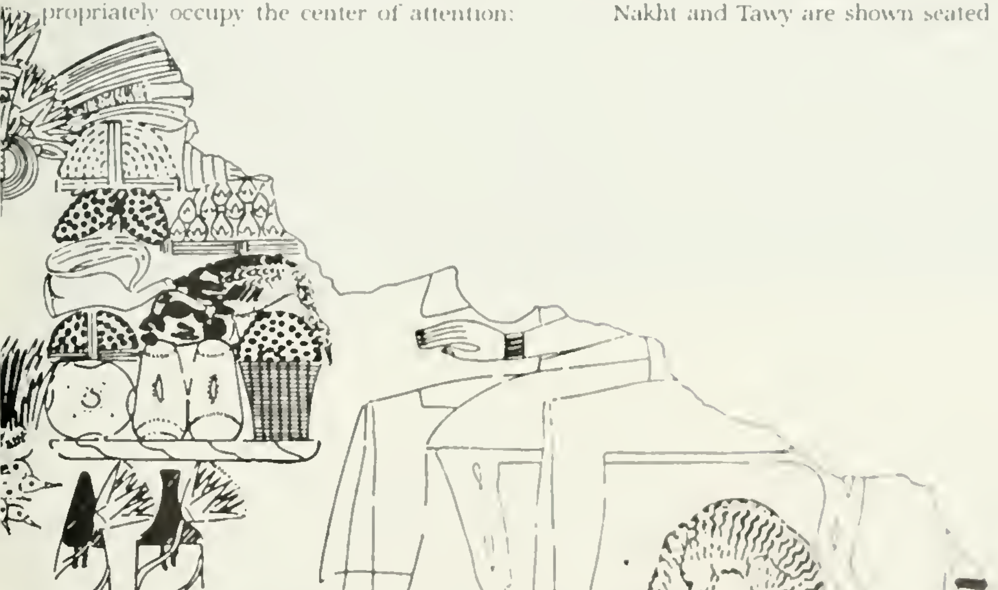
Nakht and Tawy are shown seated before an offering table in the space above the lintel, while all the other surfaces are covered with prayers for the deceased's well-being. The form of these prayers is very ancient, going back to the time when burial in the royal cemetery was granted to a favored few by the king, who also guaranteed the offerings that would secure the protection of the gods. "A royal offering," they say:

> *To Osiris-Wenennefru, the Great God, Lord of Abydos, that he may allow coming and going in the cemetery without the Ba's being hindered from what it desires;*
> *to Anubis, preeminent in the divine booth, that he may grant splendor before Re in heaven, power before Geb on earth and vindication before Wenennefru in the desert;*
> *to Amun, preeminent among the holy ones, the Great God, chief of Thebes, that he may allow crossing of the river to land at Karnak, in order to eat food every day, (and) to Re-Horus the Horizon-dweller that he may allow his beauty to be seen every day, and goes forth on earth to behold the sun's disk in the manner of one who is on earth—on behalf of the Ka of the Astronomer [of Amun, Na]kht the trium[phant].*

Life on earth was sweet to the Egyptians. They could imagine nothing better, even after death.

## The Ceiling

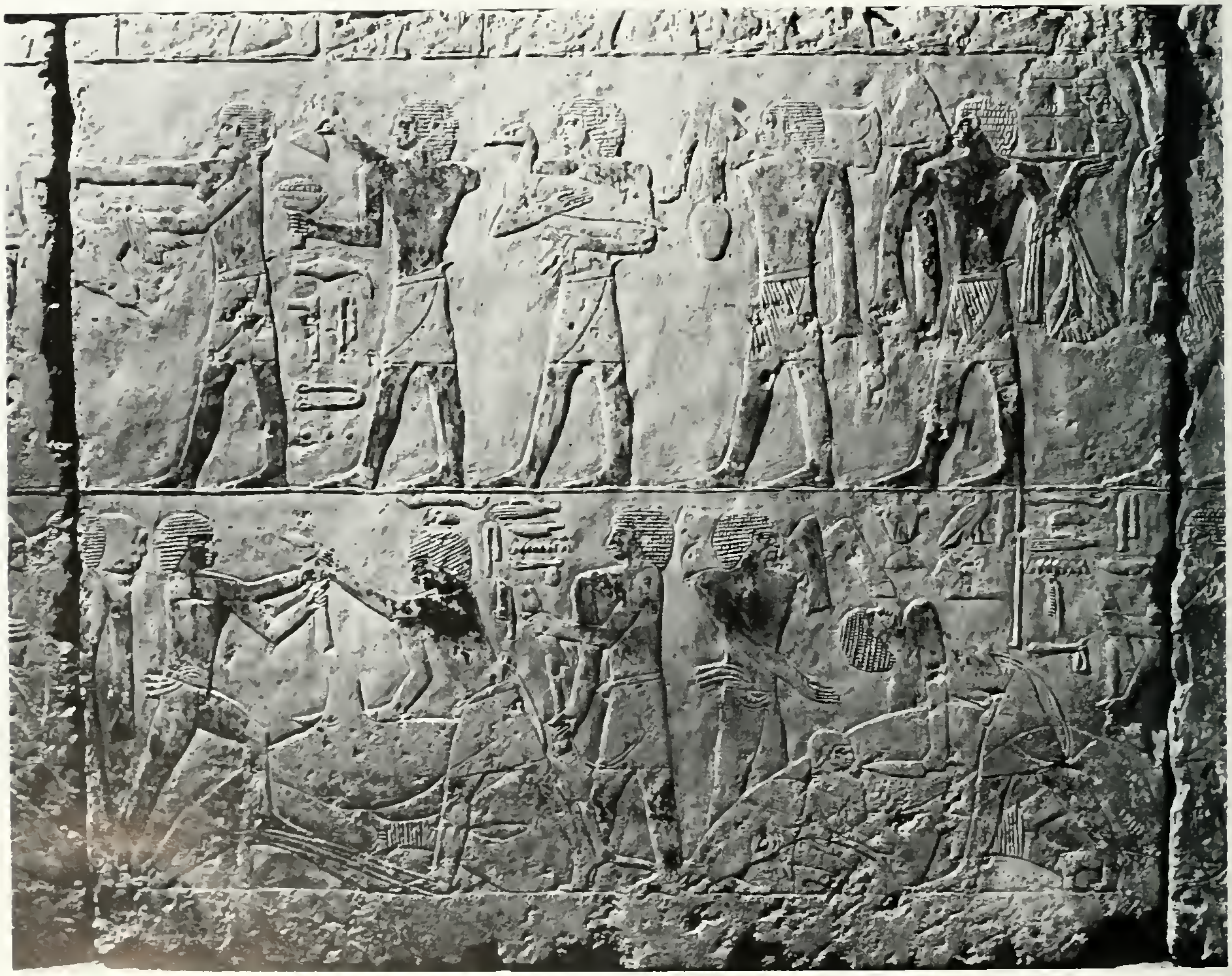
The idea of the tomb as an early Egyptian house is carried over onto the ceiling where, stretched between the roof beams, we see gaily colored hangings, all in paint. The designs are less elaborate than in other tombs, but the effect is lively and pleasing—value judgements that might well be applied to all the paintings in the tomb of Nakht.



# The Tomb Chapels of Netjer-user and Unis-ankh

*by* BRUCE WILLIAMS

*The reinstallation of the Egyptian tomb chapels has been made possible by grants from the A. Montgomery Ward Foundation and an anonymous donor.*



*The tomb chapel of Netjer-user, north wall: Most of the decoration shows offering bearers and the slaughtering of animals for meat offerings. Here, a man labelled "sharpening the knife" is shown in the center and again on the right of the lower register; a bearer just right of center in the same register says to the butcher: "Give me the heart."*

THE OLD KINGDOM (often called the Pyramid Age: Dynasties IV, V, and VI, 2613-2181 B.C.), was the time of Egypt's most impressive and enduring achievements. An age that experienced neither doubt nor failure turned naturally to the direct and commanding as modes of expression, particularly the tomb, which for many is the ultimate futility.

The Egyptians built pyramid tombs for their pharaohs, who were to be united with the sun, as expressions of that union. Eminent, but mortal, men were entombed in other monuments, which provided not only protection for the body and grave goods, but also provided the means by which essential worldly goods could again be made accessible in the next world. This reaccess was achieved by providing the facilities for ceremonies and for representations, on the tomb walls, of these ceremonies and offerings.

The central feature of the reinstallation of the Egyptian Hall is the opening of the tomb chapels of

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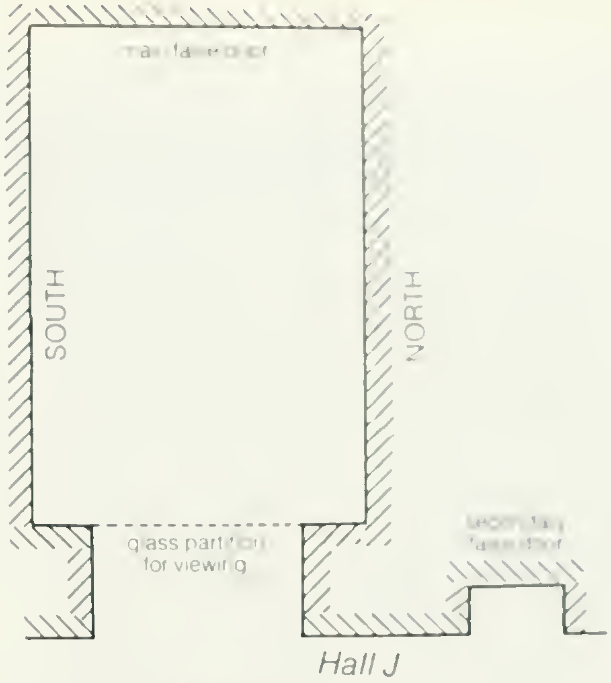
*[illegible] ciate (assistant professor) [illegible] University of Chicago.*



*Tomb chapel of Netjer-user*

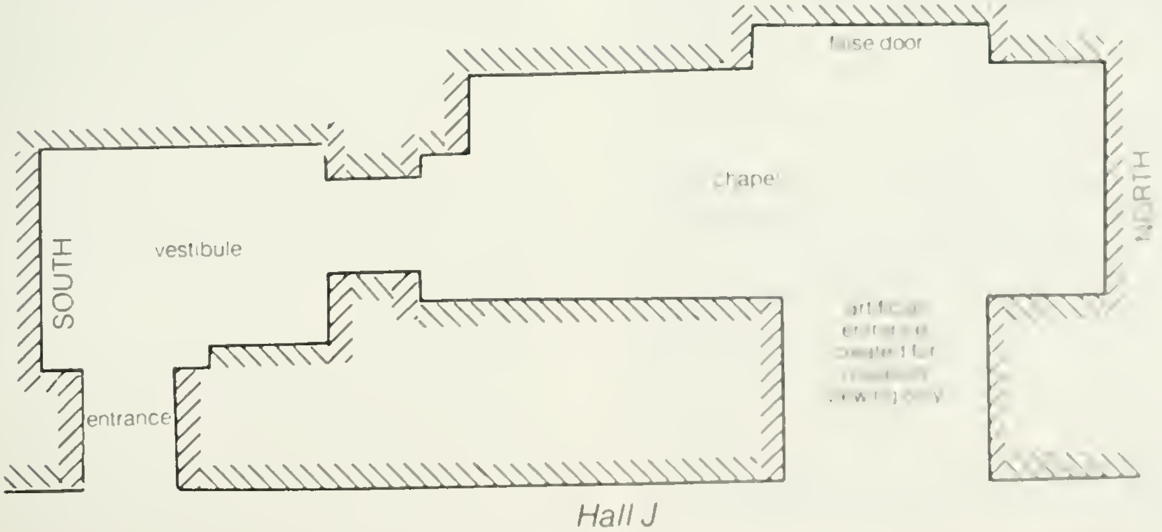
Netjer-user and Unis-ankh so that the reliefs they contain can be viewed at close hand by the visitor. The new viewing is much like that experienced by an ancient priest or relative of the deceased making offerings there. The reliefs covering the walls do not represent the entire lives of the deceased, nor even a major part of the mortuary arrangements for them; they are only the most elaborate surviving part of a large complex that was intended to transfer into the next world the deceased's achievements, wealth, and sometimes servants and relatives.

The fitted limestone blocks comprising the walls are the lining of the tomb chapel in which the needs of the dead were served by Ka-servants, or soul priests. In exchange for the proceeds from a perpetual endowment made by the deceased, these servants presented certain material goods, particularly food, on offering tables at false doors in the tombs so that the counterparts of these goods in the other world might be made available to the deceased.

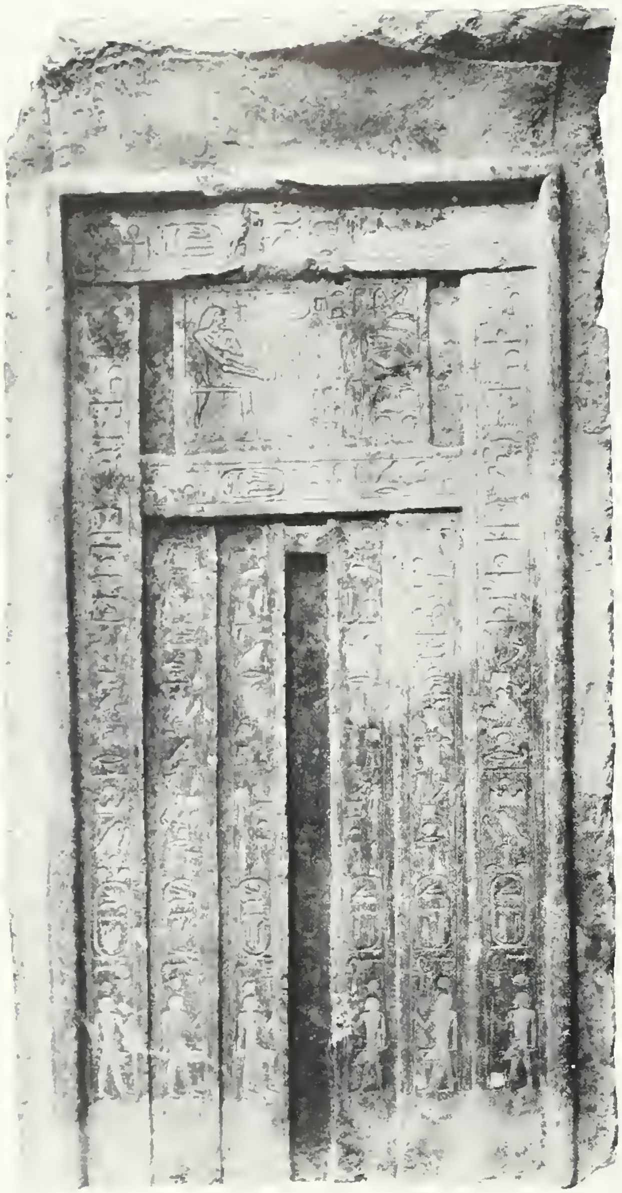
There were also special offerings made on feast days. In the event that the Ka-servant or the endowment failed, representations of these offerings, often with other desirable life activities, were put on the walls, with the appropriate persons officiating. These were accompanied by elaborate lists of offerings and shorter invocation offerings recited by the visitor in order to make quantities of foodstuffs available to the deceased ("a thousand loaves of bread, a thousand jugs of beer, a thousand cakes, etc.").

Chapels of this sort were attached to, or in the case of Netjer-user and Unis-ankh, built into rectangular stone structures usually now called *mastabas*, the Arabic term for the modern Egyptian brick bench which they resemble. Apart from their chapels and usually solid interior, the mastaba complex contained the actual burial. Usually this was situated at the bottom of a deep vertical shaft cut from the top of the mastaba into the bedrock below, and placed in a plain rock-cut chamber so oriented that it was below and to the west of the chapel's southern, or main, false door. This arrangement gave the deceased's spirit direct access to the offerings. Also generally present were one or more *serdabs*—chambers with statues of the deceased that were intended as substitutes for the body as a home for the Ka-soul; these chambers were often arranged so the statue could look through narrow apertures into the chapel. (No such chambers were found in the Netjer-user or Unis-ankh mastabas.)

Mastabas had a long, complex history in Egypt and were important in Egyptian burial customs, especially in the Archaic and Old Kingdom periods (3150-2181 B.C.). They existed during the early First Dynasty, when they were the major burial structure for pharaohs as well as for the common people. Even then, royal mortuary arrangements were complex, and around the royal tombs were small bench-tombs of courtiers and artisans who would follow their master in death. Already, during this



*Tomb chapel of Unis-ankh*



*The false door of Unis-ankh. The complex panelled false door was the main focus of the Egyptian private tomb chapel in the Old Kingdom. Offerings and libation were made before it to provide the deceased with food, drink, and clothing. Here, the frame and panels give a funerary formula, with the name and titles of Unis-ankh, as well as his figure, shown six times at the bottom. Above the doorway, Unis-ankh extends his hand to a table of offerings.*

period, some of these tiny mastabas had the two small niches in the east side; similar, nonroyal tombs, set apart from the royal ones, had tiny chapels at the southern niche, some with offerings. Also in the First Dynasty, wealthy private citizens were already building large mastaba-tombs..

Between the First Dynasty and the time of Netjer-user and Unis-ankh, many changes occurred in the mastaba. Very early, stela (stones or slabs used as monuments or commemorative tablets) showing the deceased seated at a table of offerings became the central focus of the funerary cult. By the late Third Dynasty, the stela was [illegible] the presentations of the old offerings [illegible] the false door. Walls in the chapels came to be decorated, primarily showing offering presentations, but also showing other special, daily-life events which the owners wished to be perpetuated.

The chapel itself underwent major changes. Early in the Fourth Dynasty, under Khufu (2606-2583 B.C.), builder of the Great Pyramid, the Pharaoh erected numerous large stone mastabas in neat rows near his own pyramid, giving them to his favorite courtiers and officials. However, chapels had to be added outside these mastabas, and a simple, L-shaped, brick structure was erected to house the stela and the offerings. Over a period of time, the owners and their families elaborated these chapels, modifying the deeply niched false doors of earlier times into shallower niches so they could be cut in the outer wall or in finer stone linings added to the chapel. (This shallower type may be seen in the two Field Museum chapels.)

Soon the chapel itself was erected in stone. Still later, chapels were sometimes cut into the body of the mastaba and more chambers were added to the complex. By the Fifth Dynasty, many false doors (as in the chapel of Netjer-user) were deeply recessed, making, in effect, a longitudinal chamber approaching the main false door.

Others continued using either the simple L-axis, or an elaborate version, such as that of Unis-ankh. In both, the walls by the false door were decorated with representations of the funerary repast, offerings, offering lists, and preparations necessary for the offerings. Walls farther away showed scenes of life activities which so entrance the modern visitor, but which were probably added according to the life span, resources, and plans of the owner. Such decorations were sometimes abandoned, even with figures unfinished. The tombs of Natjer-user and Unis-ankh were decorated to the extent of the offerings and the preparation of offerings, but they had not yet received other decoration, if, indeed, planned.

The useful function of many mastabas did not cease with the burial of the main owner and the establishment of his cult. After this complex with chapel, shaft, and serdabs was built, relatives, even in later generations, often sought burial there, adding shafts of their own, with new false doors in the same chapel complexes, or even new chapels and serdabs; sometimes they made additions to the basic structure itself. In extreme cases, the entire mastaba was hollowed out, creating a series of rooms and courts.

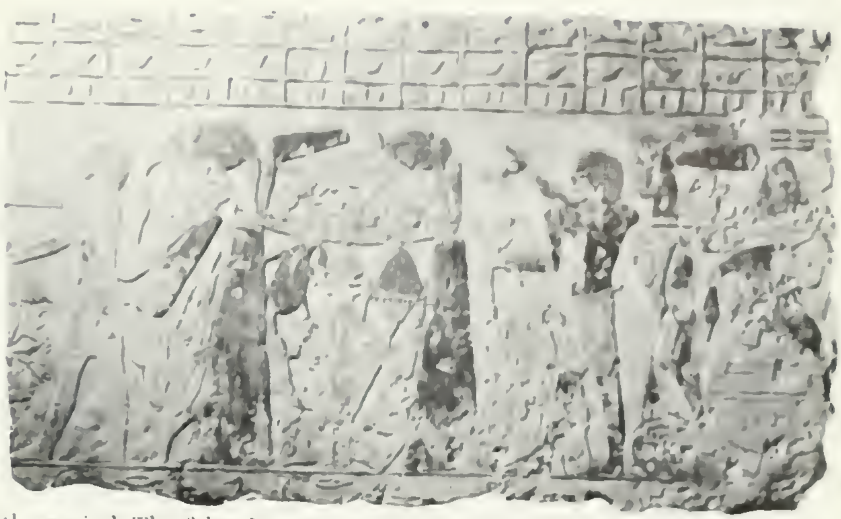
The tomb-chapels of Netjer-user and Unis-ankh were acquired in 1908 by the Field Museum, one of them through purchase from the Egyptian government, the other as the result of a gift from Trustee Martin A. Ryerson. A vast number of lesser chapels were found during that period at Saqqara, and a number of these were acquired in this way by major museums of the world. What is on exhibition is not the entire chapel complex, but only major decorated surfaces.

Netjer-user was a powerful courtier and official in the mid-Fifth Dynasty (*ca.* 2400 B.C.). Among his most important titles were "royal chamberlain," "controller of scribes," "overseer of royal works," "supervisor of masters of the king's largess," and "master of largess in the mansion of life." The last two indicate that he was responsible for the redistribution of offerings from the major royal temples to other temples and private tombs, a position of considerable power and influence apart from his court position indicated by the titles "royal chamberlain" and "controller of scribes." Like any active courtier of his time, Netjer-user collected a long string of titles, some representing actual functions, others purely honorific, that marked his progress in royal favor through his career.

After Netjer-user, his family did not exactly suffer eclipse, and we know a fair number of his descendents, as assembled by Klaus Baer, of the Oriental Institute of the University of Chicago. In fact, it would appear that a grandson, Per-Neb, was the owner of the mastaba now in the Metropolitan Museum, in New York.

The main chambers of Netjer-user's mastaba included a rectangular outer court with antechamber and a two-part chapel, an outer chapel of the standard indirect axis, containing the second, or northern, false door, and a deep, long-axis chamber that extends to the west from the southern end of the west wall. Such chambers were developed when the deepening of the southern, or major, false door's niche became so great that a new chamber was created.

The decoration of Netjer-user's chapel had proceeded only as far as the completion of the inner, longitudinal room and the second false door. On this door are identified both Netjer-user and his wife Khenut. Her figure has been added in front of Netjer-user's on either side of the niche, following completion of the original carving. Khenut may have been an intended beneficiary of the offerings left at this outer door. This false door was also inscribed with Netjer-user's name and titles; the figure of Netjer-user, again with his name and titles, is on the wall of the inset on either side (as though this were a small chamber). His wife is described as "the eternal companion, his beloved wife, the royal lady-in-waiting, honored before Pharaoh, Khenut."



*Portion of the north wall of Netjer-user's inner chapel. Stands hold offering baskets. At right, a man offers flaming incense.*

The doorway leading to the inner chapel was decorated with offering bearers. Within the inner chapel, the major feature is the great false door occupying the west wall. The quality of the relief in the hieroglyphs and the figures nearest the west wall has been recognized as among the best from the period. The false door is inscribed with Netjer-user's name and titles and begins with the invocation across the top "May the king give an offering, and may Anubis, foremost of the divine booth, who is in the mummy wrappings, give an offering so that he may be buried in the necropolis at a good old age."

On either side, on the north and south walls*, is the figure of Netjer-user, with his name and titles, seated in a chair with animal legs and wearing the leopard skin of a priest. He is three times larger than other human figures shown in the registers, or design panels. (See illustration, p. 30.) In the lowest registers are butchering scenes, with a bovine on one side and an oryx on the other (this exotic animal was actually herded by the Egyptians at this time), ending with the inspector of Ka-servants "bringing choice cuts."

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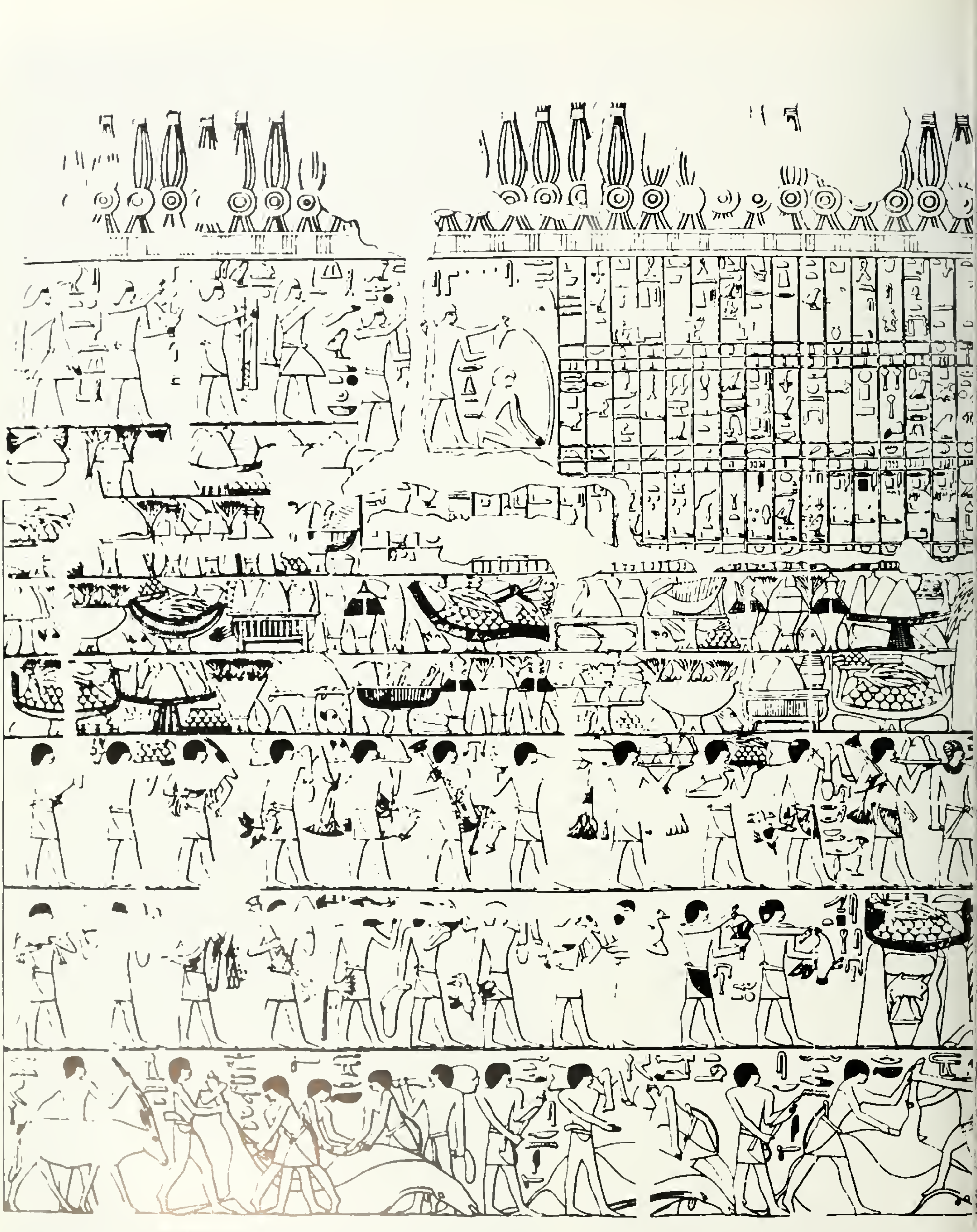
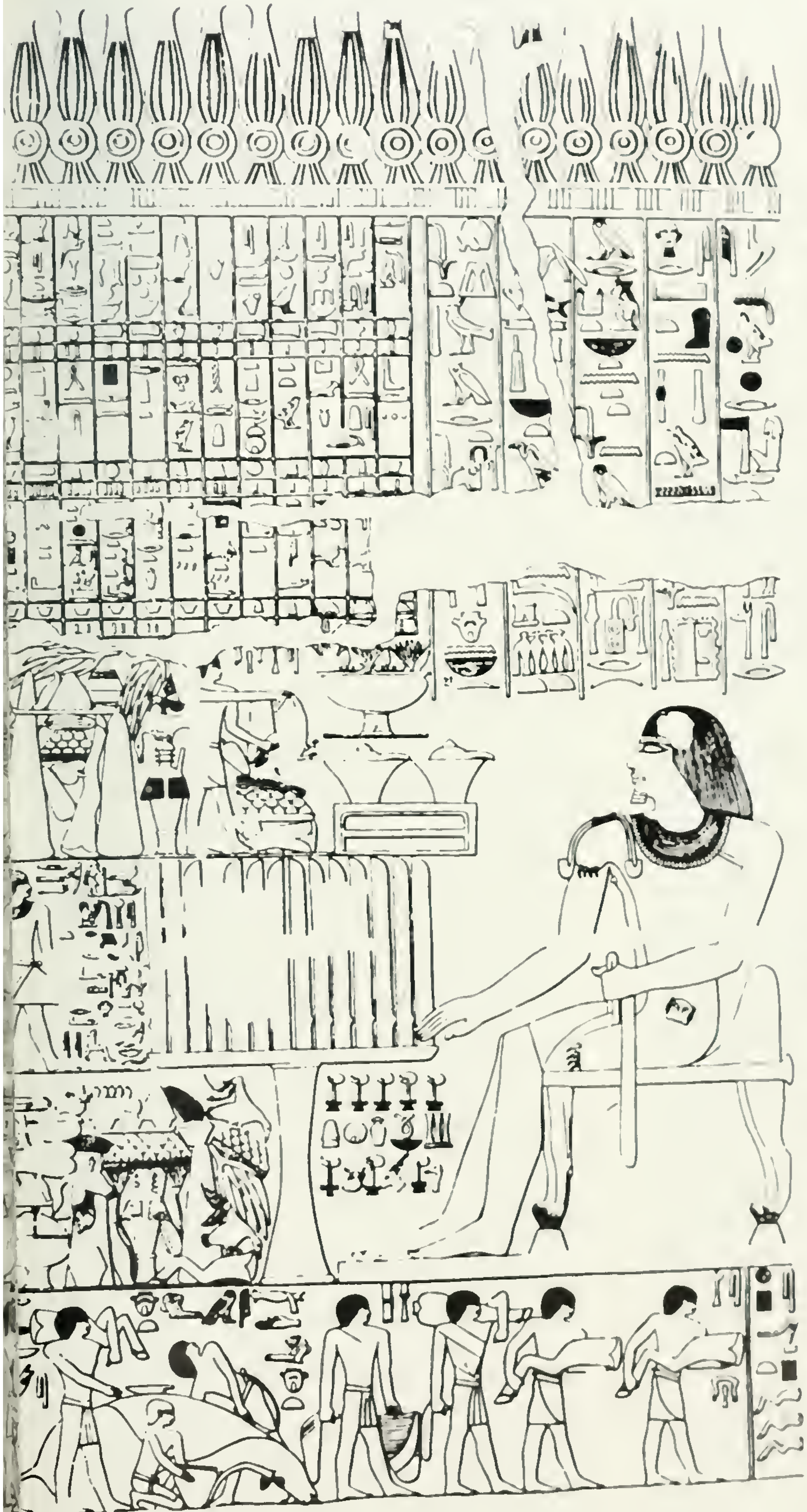
*The tomb-chapels of Netjer-user and Unis-ankh are installed at Field Museum with the same compass orientation as in their original sites.*

*Dismantling Unis-ankh's tomb, about 1908*



TOMB CHAPEL OF NETJER-USER, SOUTH WALL

Copy of wall illustration reproduced from drawing in *Saqqara Mastabas*, Part 1, by Margaret A. Murray (London: 1905)



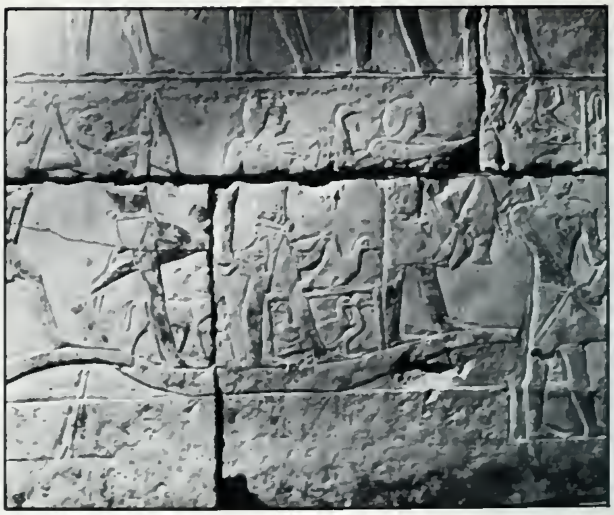
Directly opposite Netjer-user are registers showing offering bearers with provisions of all types, which are deposited — in piles, baskets, jars, even on tables and on curious double stands before Netjer-user. In addition to heaps of food offerings (labeled "choice things"), there are bowls of flowers, burning incense, and natron (used in mummification and in purification rites). The processions are led by two sons, the first an "inspector of lay priests and scribe of decrees in the presence of the king . . . Rashepses," the second, the "senior scribe" Netjer-user (Junior). This second Netjer-user's name is not in the high-quality raised relief of the other signs but is simply cut into the wall, and, it would appear, added later. This same kind of intrusive insertion occurs in the register below, where the Ka-servant Nakht is named. It seems that the sons' names and Nakht's were added later as a kind of intrusion, not intended by the owner.

Above and in front of Netjer-user is an offerings list, a very important and standardized part of tomb inscriptions. Behind the list is a register showing the daily ritual intended for the tomb. The offering presentations continue, though much more poorly carved, on the east wall. Beside the door are panels showing animals being brought. One bovine has a deliberately deformed horn, an effect achieved by hanging a weight on it for an extended period.

A detail of special interest is the border around the top of the wall. Called *khekeru* by the ancient Egyptians, this border represents wisps of straw tied in an ornamental fashion. In later times, a row of these was conventionally used to line the top of a decorated wall, but this is one of the earliest such examples in a private tomb. The tomb of Netjer-user also contained relief of especially fine quality, the best being in figures and inscriptions by the main false door.

The chapel of Unis-ankh, on the other hand, was decorated with less care in planning and execution. Unis-ankh, who owned the second tomb-chapel now in the Field Museum, lived about two or three generations after Netjer-user, in the reign of Unis, last pharaoh of the Fifth Dynasty (2430-2400 B.C.), who was his father. Unis-ankh's most important titles were "king's son," "overseer of Upper Egypt," and "royal chamberlain." His mastaba was placed in the second row between the mortuary temple of Unis and the great enclosure of Djoser, builder of the first stepped pyramid, already several centuries old in the time of Unis. The mastabas near Unis's pyramid were not built in the regular blocks seen earlier at Giza. They are arranged instead, in loose straggling rows and clusters, without any obvious organizing principle apart from the desire of the owner to be near the causeway and temple of the pharaoh; some relative ranking within the court may also have been an organizing principle.

*A papyrus boat brings meat and fowl to the tomb of Unis-ankh. The boatman, shown almost off balance, is in the act of forcing his forked pole into the mud to push the boat forward.*



Traditionally, the mastaba-tomb was longer in the north-south axis, with the entry to the chapel complex on the east side. In the vast crowd of mastabas at Saqqara this plan often had to be modified. In the restricted space next to the Unis complex, many courtiers built their mastabas on an east-west axis, parallel to the causeway; but some, such as Unis-ankh's, were jammed into tight spaces like modern townhouses and retained the north-south axis, but with the entry on the south, facing the temple of the king. Inside, the mastaba contained a complex of six chambers arranged along the south and west sides of the building and a large courtyard in the south-center, from which offerings could be taken to the chapels. The portions now in the Field Museum include the exterior entryway, the vestibule of the chapel, and the main chapel with its false door.

The east, west, and south walls of the antechamber depict the progress of a funerary offering procession to the tomb, carrying produce from Unis-ankh's estates in Upper and Lower Egypt. On the south wall are offering bearers, including men leading cattle. Part of the wall was left blank, because the door, when open, would conceal it; at the rear of the procession, an awkward space was left by the sculptor, but later filled with a painted figure.

On the east and west walls, this procession is partly transferred to small, papyrus-stalk boats which ferry the goods across the river (the registers are shorter on the east wall because of the doorway). As on the south wall, the composition was not fully planned, for we can see that one of the bearers in the third register was not given enough room; his arm is folded awkwardly in front of his chest and the man in front seems to step on his foot. The boats and their cargo make the most interesting part of the decoration, and one of the boatmen on the west wall in the lowest register is poised on one foot at the moment of poling the skiff forward. This type of figure was much admired in ancient times and there are several other examples of men similarly posed.

The processions with presentations end before Unis-ankh on both walls, and there is a shorter procession before him above the door on the north wall which leads to the main chapel itself.

Despite the fact that the chapel of Unis-ankh was oriented north-south and that of Netjer-user east-west, the decorations are arranged in much the same way in both tombs. The subjects are much the same: butchering and processions of men carrying offerings to be heaped before Unis-ankh, who is shown twice, seated to the north and to the south of his false door facing outward. As in the tomb of Netjer-user, Unis-ankh is seated before the requisite offering table, above which, again, is a list of offerings, identical in almost every detail in the two tombs. Also as in the tomb of Netjer-user, there are inscriptions below the table: "A thousand loaves of bread, a thousand jugs of beer, a thousand cattle, . . ." invocation offerings to be spoken by any visitor to the tomb.

The registers of figures are organized so that the bearers on the east and north walls approach the figure of Unis-ankh north of the false door, and those on the south wall approach the figure to the south.

This major false door occupies the center of the west wall and it is the focus of all of the decoration in the tomb complex. Here it is red, a color closely associated with the solar cult and inscribed with the invocation of royal offering above and on the outer frame-panels. On the other vertical panels are the name and titles of Unis-ankh. A striding figure of him on the bottom of each acts as both a representation and as a determinative (a standardized representation that characterizes a word in Egyptian writing).

Apart from their intrinsic interest as artifacts of ancient Egyptian life and civilization, these tomb chapels represent, less directly, aspects of social relations in the Old Kingdom. One of the most interesting aspects is the recitation of long strings of titles, which mark the standard career for the higher orders of society in which wealth and power was approached in royal service and measured by the accumulation of the titles and the offices they represented.

A second aspect is the presentation of offerings, derived by reversion from temples, or from endowments by owners, as specified in the anteroom of Unis-ankh. These endowments were a major source of support for those priests known as Ka-servants. Scholars have inferred from the progressive removal of land from the estates of the pharaoh to his officials and the accumulated alienation of land to their endowments that these endowments helped break down the concentration of royal power. The endowments thus played a role in the dismantling of royal control, which ended the greatest flowering of Egypt. ☐

# Edward E. Ayer and W. M. Flinders Petrie: ‘Founding Fathers’ of the Egyptian Collection

By Judith Cottle

FIELD MUSEUM'S COLLECTION OF EGYPTIAN ARTIFACTS came into being as the result of the interest and generosity of Edward E. Ayer (1841-1927), a Chicago businessman, and W. M. Flinders Petrie (1853-1923), an English archeologist.

## Edward E. Ayer

Born in Southport (Kenosha), Wisconsin, in 1841, Edward Ayer left home to make his way to California in 1860; he returned to the Middle West, however, finally settling down in Chicago. He became a leader in the city's cultural growth, and vigorously advocated the establishment of a natural history museum in Chicago, successfully persuading Marshall Field 1 to donate one million dollars for the project.

The Columbian Museum, as it was first known, was incorporated in 1893. The following year its name was changed to the Field Columbian Museum, in recognition of Marshall Field's sponsorship, and in 1905 it became Field Museum of Natural History. (During the period December, 1943, to March, 1966, the institution's name was Chicago Natural History Museum, after which it reverted to Field Museum of Natural History.) Ayer was the first president of the Museum, from 1894 to 1899, and served actively on its board until his death in 1927.

In the autumn of 1894, while on a Mediterranean cruise, he visited Egypt for the first time, planning to remain only five days. But Ayer was so impressed with the many historic artifacts for sale in open-air markets that he decided to stay over and make a collection for his museum.

Almost a quarter-century later, in his privately published *Reminiscences* (1918), he describes meeting Emil Brugsch-Bey, Gizeh Museum director, to obtain assistance in putting together a collection:

> *"Now, Mr. Brugsch-Bey [Ayer quotes himself], there is nothing in the world you can do for me individually; but I do not know anything I would not expect you to do here in Egypt to help in building up this new museum in the United States. I do not suppose that any grown man ever came to Egypt so ignorant of everything that is Egyptian as I am. I have collected a good deal in America and to some extent in Europe, but I am completely at sea here . . . help me understand the situation here so I may make as few mistakes as possible in securing articles here in Egypt for our collection.*
>
> *First, I want you to go through your own great museum with me and I want you to answer my questions so that I may gain an idea of what all these things mean and the relative value of the various articles. I want to know what all these things mean, what they are here for, and how I can begin to make a suitable collection. Then I want you to go up town with me . . . while we look into the shops of these dealers in antiquities and I want you to tell me what these things are and what would be a fair price for them. After that I want you to show me the frauds so I may guard myself against them as much as possible. Next, I want you to let me buy anything in Egypt whatsoever that I care to purchase, subject to your approval. And, finally, when we get all through, I want to bring everything that I have bought to this museum and spread it on tables and I want you to come and look everything over and give me your opinion about it all."*
>
> *I started right in and collected things all over town. Then I went up the Nile, got acquainted with the dealers up there and brought back a lot of stuff. Mr. Brugsch-Bey looked over and checked everything and was*

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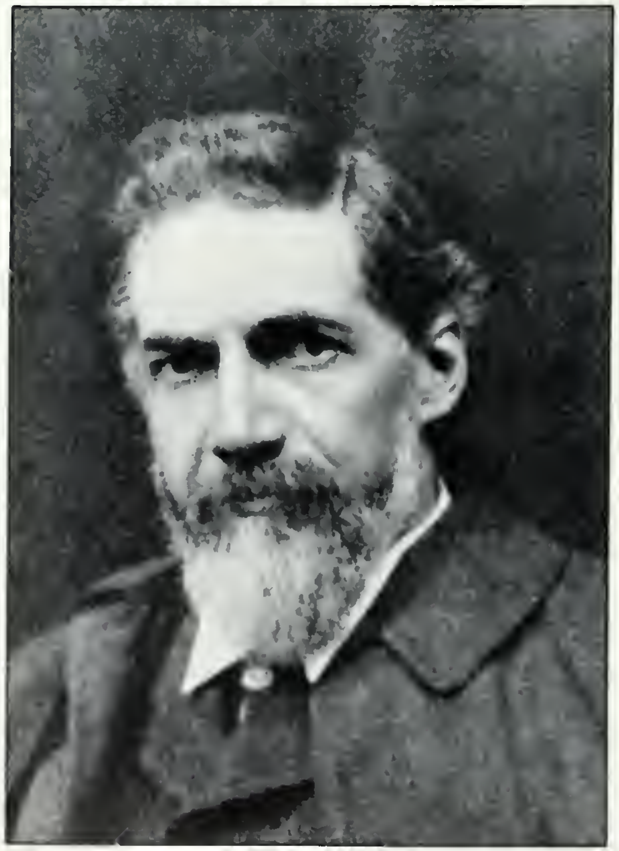
*Judith Cottle is a volunteer in the Department of Anthropology.*

Edward E. Ayer

> *good enough to say to me that I had made a very good selection and that he was astonished to find nothing that did not appear genuine. I spent about twenty thousand dollars there in Egypt on this first trip and the stuff that I got would cost ten times that amount now.*



W. M. Flinders Petrie

Ayer made more trips to Egypt, each time acquiring additional material for the Museum. Friends also donated artifacts and contributed funds for Ayer's purchases. Most of the additions to the collection through Ayer, whether gifts or purchases, were made almost every year up through 1914. (He also made gifts of a great many ethnological materials representing other cultures throughout his 33-year association with the Museum.) The Museum's *Annual Report* for 1909 describes the acquisition of the tombs of Netjer-user and Unis-ankh: "The two large Mastaba tombs, excavated under the direction of Mr. Edward E. Ayer at the necropolis of Sakara (sic), one of them being the gift of Mr. Martin A. Ryerson, . . . were received at the Museum[*] the past year and given storage in a special brick room constructed at the east unused entrance of the Museum, as it was not considered advisable to erect the tombs in the present building. The tombs filled 206 large cases, some of them ten feet in length, the total shipment weighing 96 tons. . . ."

Ayer took a proprietary interest in the Egyptian collection as well, concerning himself with how the materials were actually presented on exhibit as well as their acquisition. A harried Museum administrator wrote in desperation to James Breasted, the University of Chicago's famed Egyptologist: "I wish you would help get Mr. Ayer off my neck. He has been camped there for a long time, all because we have as yet no labels for the big stone sarcophagus and 3 or 4 mummies. I know you are very busy but if you can help us out on this we will be tremendously obliged."

Ayer fully appreciated his good fortune in being able to follow his interests and create opportunities for the enlightenment of those who were not so privileged. He made his selection of artifacts always with the idea in mind that they were for the public. "I was determined, if my prosperity continued," Ayer remarked, "to do something that would give the boy coming after me a better chance for an education than I had been able to get. That has been the prime moving thought in my work in the Newberry Library, the Field Museum of Natural History, Mr. Thomas' orchestra. . . ." He found his greatest pleasure as a collector, he said, when the artifact was placed where the public had access to it.

It must have been particularly gratifying to Ayer when he received on his seventieth birthday this note from Breasted: "I took a class of 36 students through the Field Egyptian collection last Saturday and it was a pleasure to tell them who it was to whom we owe it."

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[*] *The museum referred to here was the Jackson Park building (now occupied by the Museum of Science and Industry), which the Field Museum moved from in 1921.*

## W. M. Flinders Petrie

Sir William Matthew Flinders Petrie, born in England in 1853 and knighted in 1923, was an important figure in the development of archeology. The bulk of his work was done in Egypt, but he spent his last years excavating in Palestine, where he died in 1942, at the age of 89.

Petrie first went to Egypt in the early 1880s to survey sites. Appalled at the looting and destruction there and convinced that the study of smaller objects such as pottery was as important as that of much larger ones, he turned to excavation. Unlike his predecessors, he tried to carefully examine sites and all their contents and accurately record all available information.

His work habits were unlike those of earlier archeologists in Egypt: he was always present on the site, putting in a full day with his workers. Working at the pyramid at Hawara in 1888, he found the passages clogged with mud, so he stripped off his clothing and slid through. The artifacts being waist deep in salty water, he dug them out with his feet.

He described his cramped living quarters in a tent in the Fayyum as a "space 6$^{1}/_{2}$ feet long and almost as wide as the length....Besides the bed I have 9 boxes in it, stores of all kinds, basin, cooking stove and crockery, tripod, stand...and some antiques; and in this I have to live, to sleep, to wash and to receive visitors." Petrie prided himself on his and his staff's ability to rough it, and he ridiculed colleagues who required luxuries.

It was customary for him to work the winter in Egypt and spend the spring and summer in England, writing up his results for prompt publication. The objects found during the winter excavations were sent to be exhibited in Egypt Hall in Piccadilly. These exhibits were exceedingly well attended and caused public concern for the destruction of the Egyptian monuments. Amelia Edwards used his journals to write articles on his fieldwork for the *London Times*. Upon her death in 1892, she endowed the first professorship of Egyptology at the University of London, and Petrie was its first appointee.

The accurate dating of objects was of critical importance to Petrie. At Naukratis, in 1885, he employed the innovative technique of dating temples and other structures by means of coins and inscribed objects found in the buildings' foundation levels. Petrie also used imported objects of a known age to date the archeological strata in which they were found.

Petrie considered sequence dating—a method of differentiating earlier from later artifacts—one of his major contributions. He first used this method at Naqada, a large cemetery with burials filled with pottery and other grave goods found in 1894. Using material from this site, Petrie studied the gradual changes in shape and decoration of vessels. He traced various types of flints, pots, and stoneware, their period of use and gradual disuse. In this way he set up a scale of sequence dates of 1 to 100. One to 30 was a period of unknown beginnings, 80 to 100 was a transition to dynastic styles. Each type corresponded to a number in this rough chronology.

Petrie has been called the founder of systematic Near Eastern archeology, for he introduced reputable excavation methods and greatly improved the standards of field archeology. He was the first archeologist in Egypt to insist on carefully recording all finds no matter how insignificant they seemed and to stress the importance of a scientific method of dating. In addition, he established the British School of Archaeology in Egypt and trained a generation of Egyptologists, many of whom refined his techniques. Among his more distinguished students were Howard Carter (discoverer of Tutankhamun's tomb), Ernest Gardner, Sir Alan Gardiner, Guy Brunton, and Gertrude Caton Thompson.

He had a deep love for fieldwork. It was among the ruins, he remarked, that "the real tranquility and room for quiet thought in this sort of life is refreshing. I live here and do not have to scramble to fit myself to the requirements of others."

Petrie's work was supported by museums throughout the world. In gratitude for its contributions, he presented a large number of artifacts to the Field Museum in 1897. Some of these pieces are currently on view in Hall J. ☐

### Further Reading

Egypt, General

Baines, J., and Malek, J., *Atlas of Ancient Egypt* (London: 1980).

Gardiner, A. H., *Egypt of the Pharaohs* (New York: 1961).

Fagan, B., *The Rape of the Nile* (New York: 1979).

Predynastic

Butzer, K. W., *Early Hydraulic Civilization in Egypt* (Chicago: 1976)

Emery, W. B., *Archaic Egypt* (New York: 1967).

Hoffman, M. A., *Egypt before the Pharaohs* (New York: 1980).

Kees, H., *Ancient Egypt: A Cultural Topography* (Chicago: 1979).

New Kingdom

Nims, C. F. *Thebes of the Pharaohs* (London: 1965).

Davies, N. De G., *The Tomb of Nakht at Thebes* (New York: 1917).

Old Kingdom

Lauer, J. P., *Saqqara* (New York: 1979).

Dunham, D., *The Egyptian Department and its Excavations* (Boston: new edition forthcoming)

Smith, W. S., and Simpson, W. K., *The Art and Architecture of Ancient Egypt* (New York: 1981).

Ayer and Petrie

Lockwood, F. G., *The Life of Edward E. Ayer* (Chicago: 1929)

Petrie, W. M. F., *Seventy Years in Archaeology* (New York: 1932)

# November and December at Field Museum

*November 16 through December 15*

## New Exhibits

"In the Shadow of the Pyramid." Opens Nov. 21. A newly designed section of the Egyptian Collection, Hall J, presents prehistoric and early historic exhibits in proper context. Visitors can walk through the tomb chapel of an Egyptian named Unis-ankh and view the afterlife offerings in another tomb through a glass wall. Outside the entrance to the Egyptian Room the replica of the Tomb Chapel of Nakht, on loan from the Metropolitan Museum of Art, has been installed. The chapel walls are covered with some of the finest known Egyptian tomb paintings. See "New Programs," below, for tours in conjunction with this exhibit. Exhibit curator, Donald Whitcomb; designer, Clifford Abrams. Hall J, Ground Floor.

## New Programs

Fabric of Culture Festival. How textiles are made and used in various cultures is the subject of this day-long event. Activities include sheep shearing, sari wrapping, spinning, weaving, dyeing, knitting, silk screening, and more. Bring your own textiles in for evaluation and commentary by experts. Authentic Turkish music will be played and sung at 2:30 and 3:30 p.m. Rounding out the program will be talks, tours, and films. Sunday, November 15, 11 a.m. – 4 p.m.

Edward E. Ayer Film Lecture Series. A culinary trip through Spain and travel to some of Denmark's 500 islands are featured. Narrated by the filmmakers, these free 90-minute films are shown in Simpson Theatre, Saturdays at 2:30 p.m. Admission is free through the West Door. Members receive priority seating. Nov. 21: "Spain à la Carte" by Ric Doherty. Nov. 28: "Denmark" by Willis Butler.

Family Film Series. Films depicting family life in different parts of the world. These free movies will be shown the first three Saturdays in December in Simpson Theatre at 11:30 a.m. and 1:30 p.m. The Discovery Tours on each Saturday will be tied into the film's subject matter. Dec. 5: "Yang Xin: Peasant Painters of China." Dec. 12: "Storm Boy," the adventure story of a boy, an aborigine, and some pelicans in the outback of Australia. Dec. 19: "Serama's Mask."

Gamelan Mini Concerts. Saturday, Dec. 5, 2:00 and 3:00 p.m., Hall K. The Adult Education Class, Gamelan Repertory Ensemble, performs Javanese music on the Museum's 24-piece gamelan orchestra. Free, with Museum admission.

Wind Songs. Come enjoy the delightful music of flute artist Douglas Ewart and his group, Inventions, in a special free concert Sunday, Dec. 13, 2:00 p.m. It features Ewart and Hamid Hank Drake on winds and percussion, with dance by Nilaja Nivonu; also demonstrations of styles and origins of flute music, and flute construction. Free admission to the Museum. West Entrance.

Weekend Discovery Programs. On Saturdays and Sundays you can participate in a variety of free programs. Check *Weekend Sheet* at Museum entrances for location and additional programs

- ☐ Sunday, Nov. 15: "New World Foods." How plants from the Americas influenced cultures around the world. 1:30 p.m.
- ☐ Saturday, Nov. 21: "The Shadow Catcher." From Our American Heritage series. Film about Edward S. Curtis, early photographer of American Indians. 1:30 p.m.
- ☐ Sunday, Nov. 22: "Life in Ancient Egypt." Tour focuses on objects and practices (including mummification). 2 p.m.
- ☐ Saturday, Nov. 28: "Audubon" From Our American Heritage series. Film traces the travels of Audubon. 1:30 p.m.
  "Chinese Ceramic Traditions." Tour of Field Museum's collection covering 6,000 years of ceramic art. 2:30 p.m.
- ☐ Sunday, Nov. 29: "Exploring Great Egyptian Pyramids." Slide presentation showing the development of pyramids and mastabas. 1:30 p.m.
- ☐ Sunday, Dec. 6: "Fireballs and Shooting Stars: Keys to th Universe." Tour explains the origins, types, and importance o meteorites. 12 noon.
  "Story of the Tomb of Nakht at Thebes." Slide presentation followed by tour.
- ☐ Saturday, Dec. 12: "Exploring Saqqara: Decorated Egyptian Tombs from the 5th and 6th Dynasties." Slide presentation followed by tour.
- ☐ Sunday, Dec. 13: "Travels with Plants." Tour of new world foods explains how plants got from the Americas to Europe t our table. 1 p.m.

## "In the Shadow of the Pyramids" Special Programs

Saturday, November 21: 11 a.m. to noon, and 1 to 3 p.m.: Preparation of books in the style of the ancient Egyptians, includin preparing papyrus, hieroglyph writing, scroll painting and explanation of Egyptian writing. Hall J. 11:30 a.m.: "Ancient Egypt Tour. Hall J. 12 noon: "Old Kingdom Tombs at Field Museum – From Discovery to Reopening." Slide lecture, Lecture Hall 1. 12:30 p.m.: "Why Mummies?" Tour. Hall J. 2 p.m.: "Egypt—Red Land Black Land." Tour. Hall J. 2:30 p.m.: "Middle Eastern Dance and Music." Demonstration by Dahlena's Middle Eastern Dancers Lecture Hall 1. 3:30 p.m.: "History of the Tomb of Nakht." Slid lecture. Lecture Hall I.

November and December Hours. The Museum is open from 9 a.m to 4 p.m., Monday through Thursday; 9 a.m. to 5 p.m., Saturda and Sunday; and 9 a.m. to 9 p.m., Friday.

The Museum Library is open weekdays from 9 a.m. to 4 p.m Closed Thanksgiving, Nov. 26. Obtain a pass at the receptio desk, main floor.

Museum Telephone: (312) 922-9410

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# FIELD MUSEUM OF NATURAL HISTORY BULLETIN

December 1981

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**Field Museum**
**of Natural History**
**Bulletin**

Published by
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*Director:* Lorin I. Nevling, Jr.

*Editor/Designer:* David M. Walsten
*Calendar:* Mary Cassai
*Staff Photographer:* Ron Testa

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***Appointment Calendar for 1982***
Featuring masks of the Maritime people of Alaska and the Northwest Coast in the Field Museum collection
Photography by Ron Testa, Field Museum photographer **4**

***December and January at Field Museum***
Calendar of coming events ***back cover***

COVER

*"Spirit of Winter" mask, Tsimshian (Skeena River, British Columbia). Cat. 18114. Photo by Ron Testa.*

## FIELD MUSEUM TOURS to The Bahamas, Alaska, Galapagos and Ecuador

*For reservations, brochures, or tour details, please write or call the Tours Office: 322-8862, at Field Museum*

### Ecology Tour of New Providence and Andros Islands

*March 7–14*

The Bahama islands are blessed with an exceptional variety of tropical and subtropical fauna and flora. The first stop in our 8-day tour will be Nassau, on New Providence Island. We'll stay at a first-class hotel, The Pilot House. From Nassau we'll fly to Andros Island. The Andros Field Station, not open to the public, will be our Andros home, with cabins sleeping 2 or 4 persons. Our study of the barrier reef will be from specially designed boats; with the aid of lifejackets, even nonswimmers will enjoy snorkeling in this marine wonderland. After Andros we'll return to the Pilot House. Biologist and ecologist Margaret Rabley, who lived in the Bahamas for 14 years, will be our guide. She was science coordinator and lecturer at the College of the Bahamas and has written or coauthored several books on Bahamian wildlife. Tour price: $875 (per person, double occupancy).

### Alaska Native Culture Tour

*June 19–July 1, 1982*

This tour begins with a flight from Seattle to Sitka, where we'll spend two days. Our third, fourth, and fifth nights will be aboard two yachts, which will take us to Admiralty Island. We'll [illegible] Tenakee Hot Springs, Angoon and Hoonah villages, and tour Glacier Bay. Sightseeing in and around Juneau will occupy us for 2 days, then to Anchorage, Denali National Park, Kotzebue, Nome, and again Anchorage. All hotel accommodations will be first class; the two yachts accommodate 16 and 10, respectively. Tour rates to be announced.

### Ecuador and the Galapagos

*March 11–25, 1982*

The Galapagos Islands affect our imagination like no other place on earth. Field Museum is pleased to offer an opportunity to visit them under the guidance of Dr. John W. Fitzpatrick, associate curator and head, Division of Birds. If you are a "birder" or a "photographer" this tour is Utopia. In addition to the sightseeing and learning opportunities on the cruise, we will spend 4 nights in Quito, Ecuador, where we'll enjoy old world ambience, along with the color of the Indian market. We'll also visit nearby villages, paying special attention to the unique bird life. Our cruise ship, the 2,200-ton *MV Buccaneer*, originally designed for 250 passengers, was refurbished in 1976 to carry 90, and has recently been again refurbished. All cabins are outside, with private bath. Though we'll be in the tropics, the cooling Humboldt Current will keep us comfortable. The tour price is $3,550 (per person, double occupancy).

# MARITIME PEOPLES
# of the Arctic and the Northwest Coast

*By* JAMES W. VANSTONE *and* RONALD L. WEBER

*New Permanent Exhibit Opens in Hall 10 on April 24, 1982*
Members' previews April 22 and 23

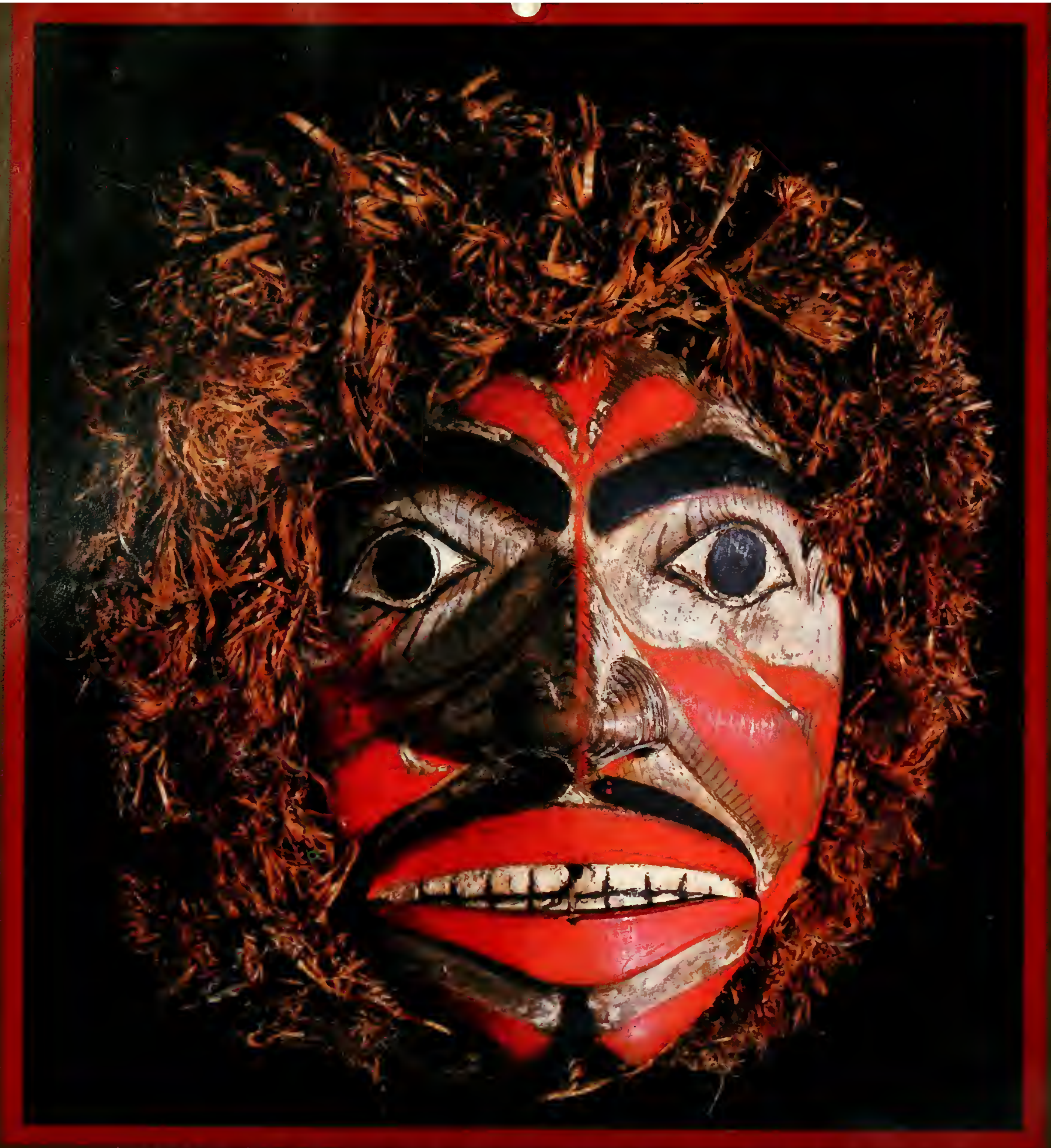
An important event to take place at Field Museum in 1982 will be the opening of a new permanent exhibit in April, depicting Indian and Eskimo cultures of the Pacific coast of North America from the state of Washington to the Arctic Ocean. This vast maritime region encompasses a number of environmental zones, and the purpose of this new exhibit will be to show how the inhabitants of these zones have adapted to their environment, with special emphasis on their utilization of marine resources.

It is the abundance of fish and sea mammals that has made possible, in this area, a cultural complexity unique among the world's hunters and gatherers. Characteristic of the region is permanent or semipermanent residence in large coastal villages, a complex and highly efficient material culture related to subsistence, unique art styles, and the elaboration, by some groups, of religion, ceremonialism, and social organization.

The new exhibit, located in Hall 10 on the main floor, will be divided into five self-contained galleries: Introduction; Fishing, Hunting, and Gathering; Village and Society; Spiritual World; and Art. The Introduction will summarize prehistory and history of the north Pacific region and feature a dramatic diorama depicting the environment. In the four other galleries the exhibited material will be presented on three levels. There will be dioramas and other dramatic presentations intended to appeal to casual visitors and those with limited time to view the exhibits. For interested visitors, the bulk of the specimens will be exhibited in their cultural context. Finally, there will be study areas where serious visitors and students can examine numerous examples of important items of material culture such as baskets and ceremonial masks, thus achieving an understanding and appreciation of the many variations possible within a single cultural form.

The ethnographic specimens which make up this new exhibit, many of them collected for the World's Columbian Exposition in 1893, are among the finest in Field Museum's North American Indian collections. The 1982 calendar features 17 Northwest Coast and Eskimo masks which represent the range of styles found in the exhibit. □

*James W. VanStone is curator of North American archeology and ethnology; Ronald L. Weber is visiting assistant curator, Department of Anthropology.*

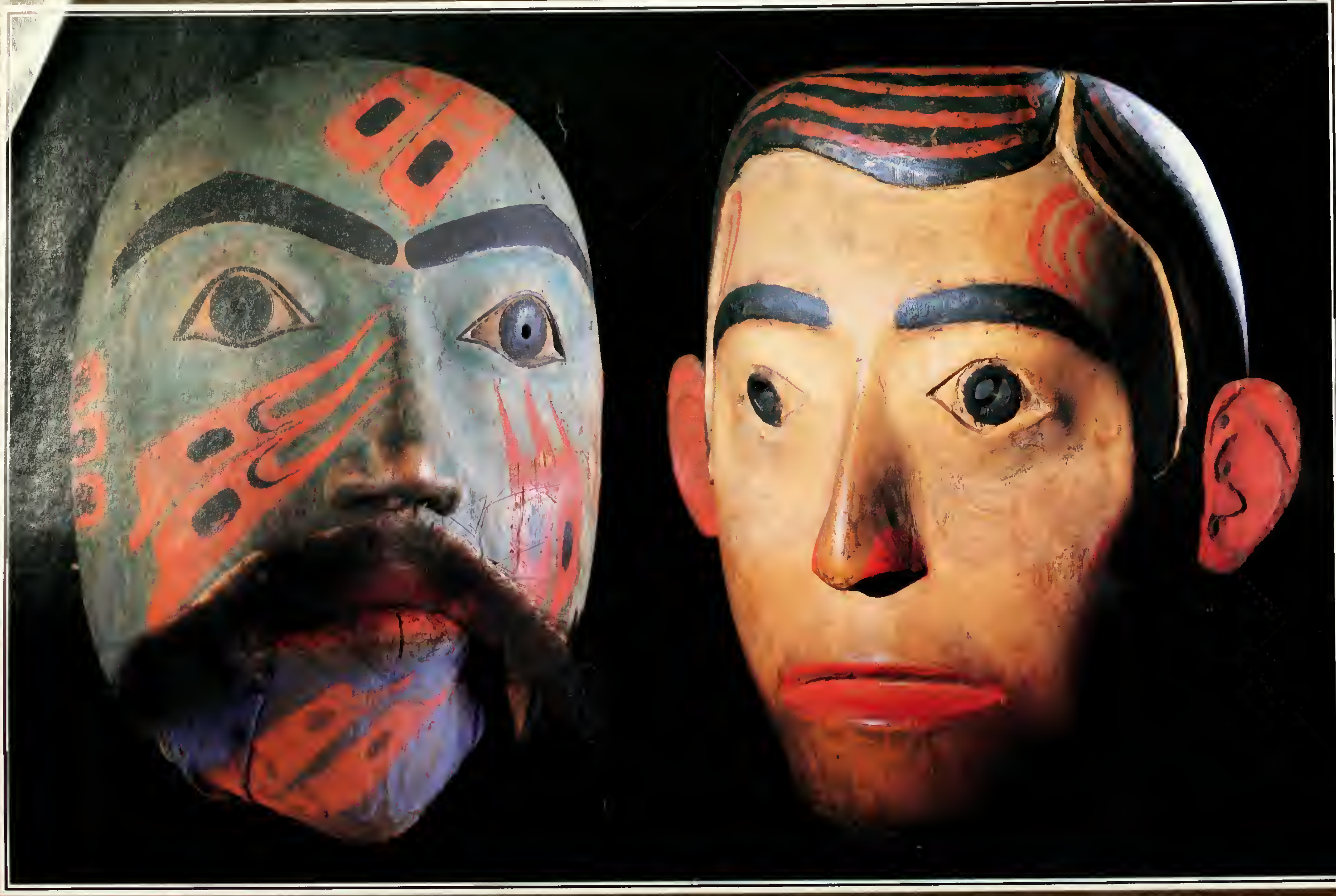


*Mask worn on shoulders during dog eater's dance; Haida (Kaigani). Cat. 79523.*

# JANUARY

# FIELD MUSEUM OF NATURAL HISTORY

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
|---|---|---|---|---|---|---|
| **DECEMBER 1981**<br>S M T W T F S<br>1 2 3 4 5<br>6 7 8 9 10 11 12<br>13 14 15 16 17 18 19<br>20 21 22 23 24 25 26<br>27 28 29 30 31 | **FEBRUARY**<br>S M T W T F S<br>1 2 3 4 5 6<br>7 8 9 10 11 12 13<br>14 15 16 17 18 19 20<br>21 22 23 24 25 26 27<br>28 | | *Teachers: January and February are good months to bring your class to Field Museum for an educational field trip.* | | **NEW YEAR'S DAY** Museum closed<br>1 | 2<br>***Discovery Programs** each Saturday, Sunday* |
| 3<br>◐ *first quarter* | *Earth closest to Sun (perihelion): 91.4 million miles*<br>*Quadrantid meteor shower (100/hr)*<br>4 | 5 | 6 | 7 | 8 | 9<br>***Winter Workshops** for children begin*<br>○ *full moon* |
| 10 | 11 | 12 | 13<br>*Register now for **Adult Education courses*** | 14 | Martin Luther King's Birthday<br>15 | 16<br>◑ *last quarter* |
| 17 | 18<br>● *new moon* | 19 | 20 | 21 | 22 | 23 |
| 24<br>31<br>*Latin American Neighbors Day* | 25 | 26 | 27 | 28 | 29 | 30 |

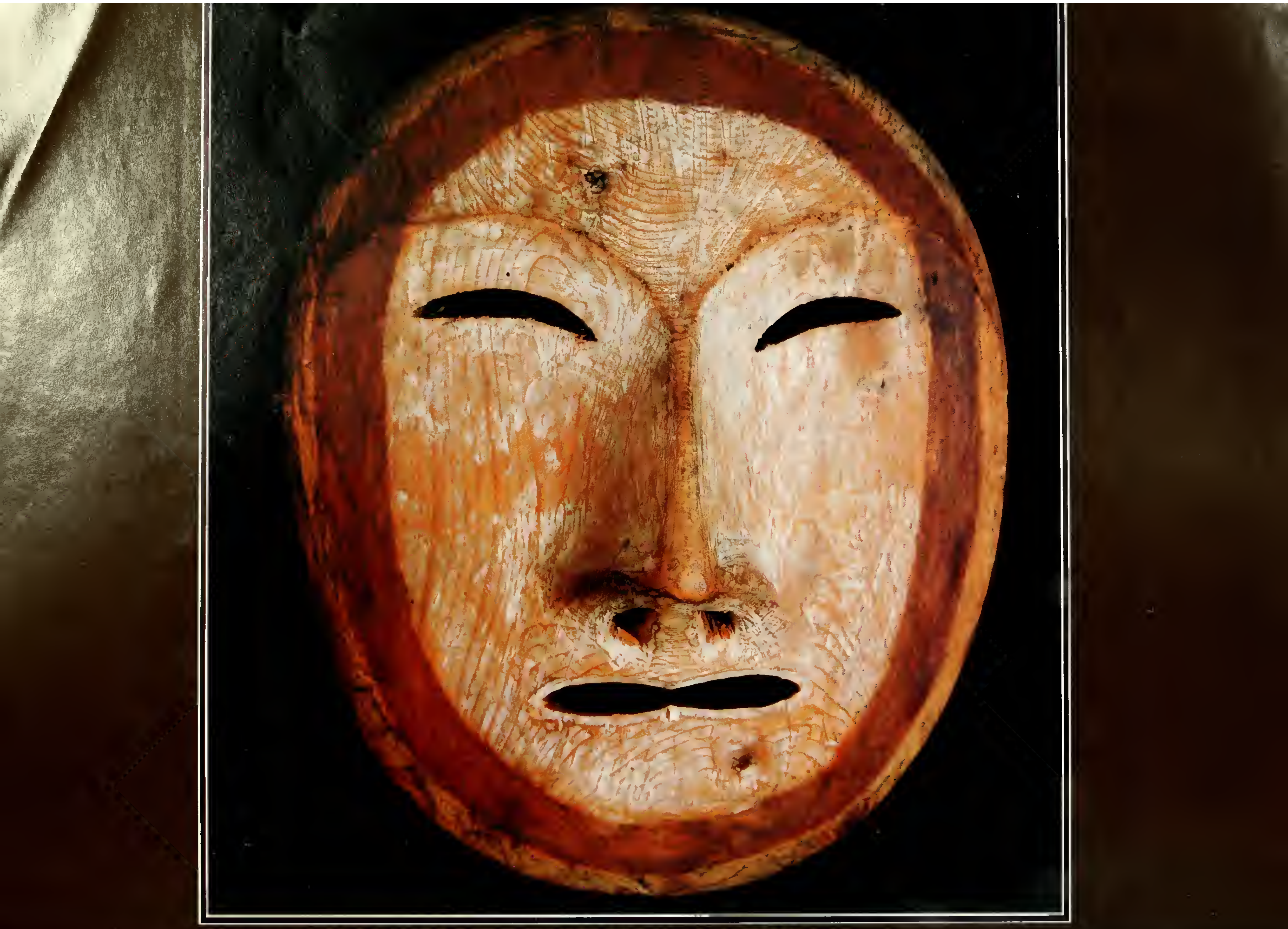


Human face shown during theatrical performances; Haida (Kaigani). Cat. 79516. Potlatch mask, child of the sun; Tsimshian (Gitksan). Cat. 53112.

# EBRUARY

# FIELD MUSEUM OF NATURAL HISTORY

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
|---|---|---|---|---|---|---|
| | 1<br>**Winter Adult Education Courses** *begin*<br>◐ *first quarter* | Groundhog Day 2 | 3 | 4 | 5 | 6 |
| 7<br>**Discovery Programs** *each Saturday, Sunday* | 8<br>○ *full moon* | 9 | 10 | 11 | LINCOLN'S BIRTHDAY 12 | 13 |
| Valentine's Day 14 | 15<br>WASHINGTON'S BIRTHDAY<br>◑ *last quarter* | 16 | 17 | 18 | 19<br>*"Hidden Valleys of Tibetan Myth and Legend," lecture by E. Bernbaum* | 20 |
| 21 | 22 | Shrove Tuesday 23<br>● *new moon* | Ash Wednesday 24 | 25 | 26 | 27 |
| 28 | | | | | JANUARY<br>S M T W T F S<br>1 2<br>3 4 5 6 7 8 9<br>10 11 12 13 14 15 16<br>17 18 19 20 21 22 23<br>24 25 26 27 28 29 30<br>31 | MARCH<br>S M T W T F S<br>1 2 3 4 5 6<br>7 8 9 10 11 12 13<br>14 15 16 17 18 19 20<br>21 22 23 24 25 26 27<br>28 29 30 31 |

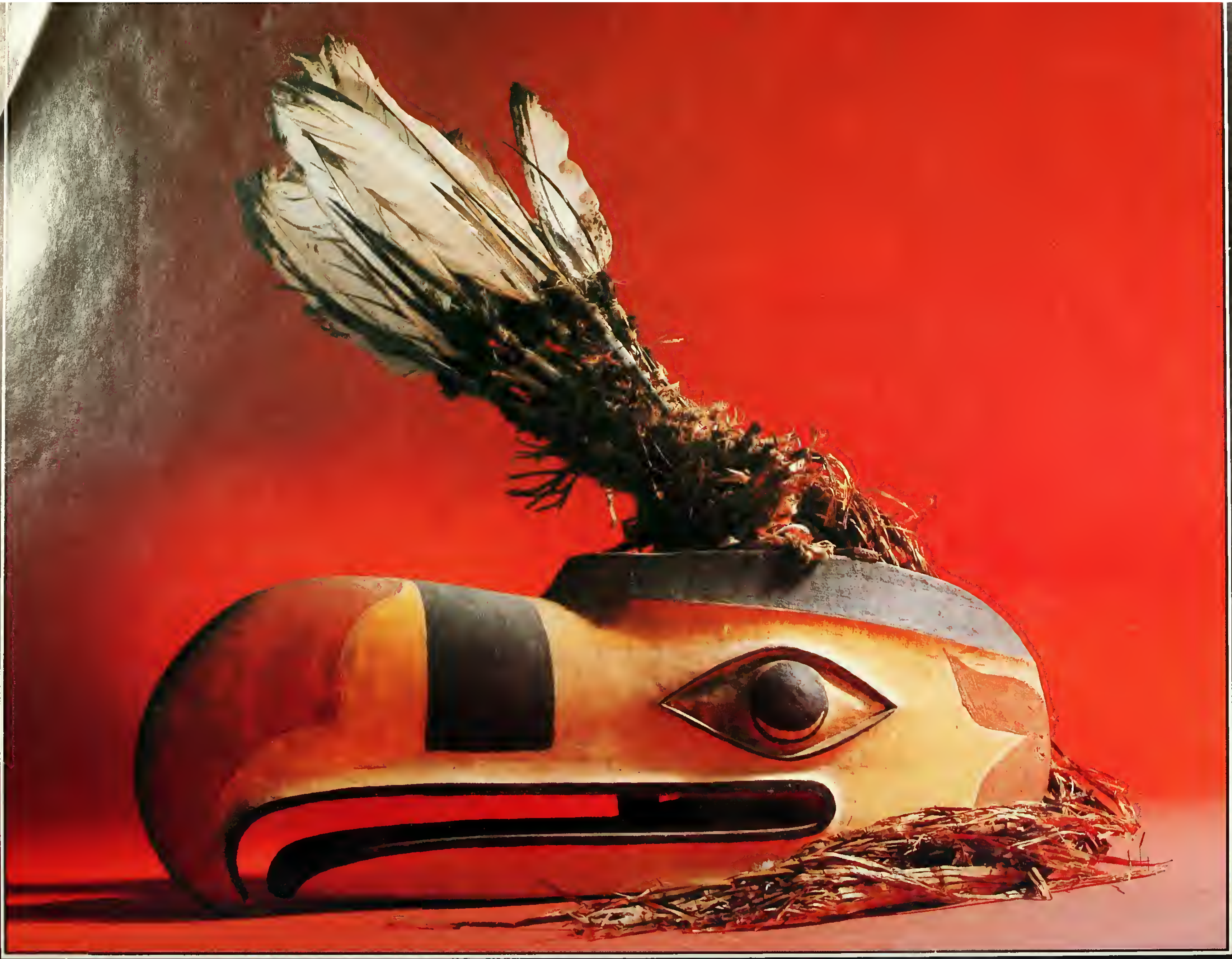


*A representation (probably) of moon-man; Eskimo (King Island). Cat. 12932.*

# MARCH

# FIELD MUSEUM OF NATURAL HISTORY

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
|---|---|---|---|---|---|---|
| | 1 | 2<br>◐ *first quarter* | 3 | 4 | 5<br>*"First Peoples of the North Pacific," Arctic & N.W. Coast lecture by K.R. Fladmark, 8 p.m.* | 6<br>***Ayer Film Lecture*** *"Newfoundland" 1:30 p.m.* |
| 7<br>***Discovery Programs*** *each Saturday, Sunday* | 8 | 9<br>○ *full moon* | 10 | 11 | 12<br>*"Pre-historic Peoples: Conquest of the Region," Arctic & N.W. Coast lecture by D.E. Dumond, 8 p.m.* | 13<br>***Ayer Film Lecture*** *"Switzerland" 1:30 p.m.* |
| 14 | Ides of March 15 | 16 | St. Patrick's Day 17<br>◑ *last quarter* | 18 | 19<br>*"Adaptations: Cultural Variations," Arctic & N.W. Coast lecture by W. Suttles, 8 p.m.* | *first day of spring* 20<br>***Ayer Film Lecture*** *"In the Footsteps of Richard Halliburton," 1:30 p.m* |
| 21 | 22 | 23 | 24 | 25<br>● *new moon* | 26<br>*"Cosmology, Role of the Shaman," Arctic & N.W. Coast lecture by G. Macdonald, 8 p.m.* | 27<br>***Ayer Film Lecture*** *"China after Mao," 1:30 p.m* |
| 28 | 29<br>*Register now for* ***Spring Adult Education Courses*** | 30 | 31 | | **FEBRUARY**<br>S M T W T F S<br>1 2 3 4 5 6<br>7 8 9 10 11 12 13<br>14 15 16 17 18 19 20<br>21 22 23 24 25 26 27<br>28 | **APRIL**<br>S M T W T F S<br>1 2 3<br>4 5 6 7 8 9 10<br>11 12 13 14 15 16 17<br>18 19 20 21 22 23 24<br>25 26 27 28 29 30 |

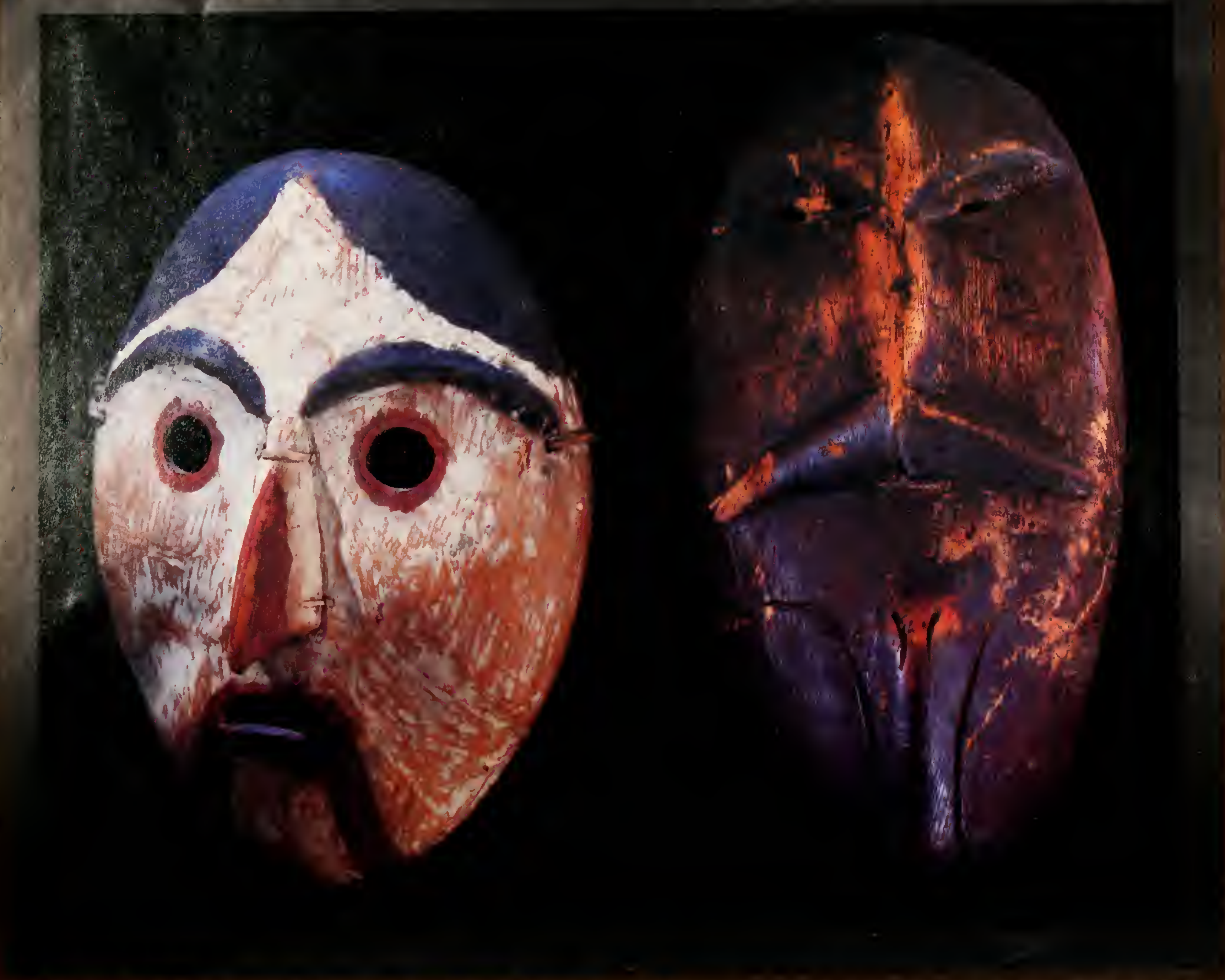


*Thunderbird mask with red cedar bark and eagle feathers; Nootkan (Makah). Cat. 19850.*

# APRIL

# FIELD MUSEUM OF NATURAL HISTOR

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
|---|---|---|---|---|---|---|
| **MARCH**<br>S M T W T F S<br>1 2 3 4 5 6<br>7 8 9 10 11 12 13<br>14 15 16 17 18 19 20<br>21 22 23 24 25 26 27<br>28 29 30 31 | **MAY**<br>S M T W T F S<br>1<br>2 3 4 5 6 7 8<br>9 10 11 12 13 14 15<br>16 17 18 19 20 21 22<br>23 24 25 26 27 28 29<br>30 31 | | | 1<br>*first quarter* | 2 | 3<br>***Ayer Film Lecture***<br>*"The Galapagos," 1:30 p.m.* |
| Palm Sunday<br>4 | 5 | 6<br>*Register now for* ***Kroc Environmental Field Trips*** | 7 | **PASSOVER**<br>8<br>*full moon* | Good Friday<br>9 | 10<br>***Ayer Film Lecture***<br>*"Paris & the Seine," 1:30 p.m.* |
| **EASTER**<br>11 | 12<br>***Spring Courses for Adults*** *begin* | 13 | 14 | 15 | 16<br>*last quarter* | 17<br>***Ayer Film Lecture***<br>*"Africa" 1:30 p.m.* |
| 18<br>*ntemporary*<br>*S posium* | 19 | 20 | *Lyrid meteor shower (15/hr)*<br>21 | 22<br>*Members' Preview of Hall 10 reopening 1:00-9:00 p.m* | 23<br>*Members' Preview of Hall 10 reopening 1:00-9:00 p.m*<br>*new moon* | ***Ayer Film Lecture***<br>24<br>*"Himalayan Odyssey" 1 30 p m*<br>*Tsimshian totem pole raising 1 p.m and ceremonial dance 3 p.m.*<br>*Public reopening of Hall 10 9 a m* |
| 25<br>*Kwaki*<br>*Dance performa 11 a m.*<br>*N W Coast demonstrati 12-2 p.m.*<br>*Tsimshian Dan performance 2 p m* | 26 | 27 | 28 | 29 | 30<br>*first quarter* | |

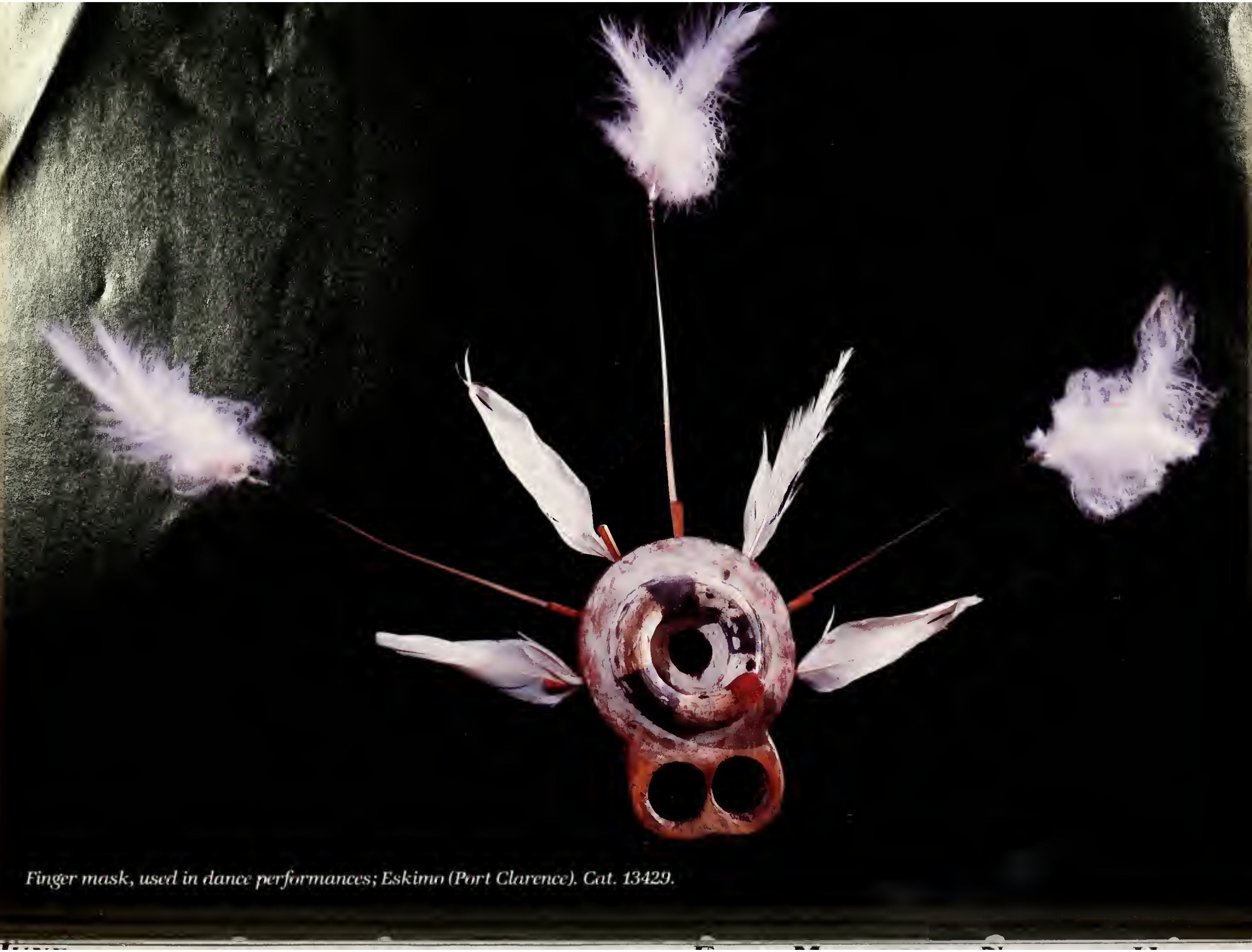


*Left: Human face; Eskimo (Port Clarence). Cat. 12936. Right: Mask shaped like a whale with its tail curved up and over to represent the nose of a human face; Eskimo (Point Hope). Cat. 53458.*

# MAY

# FIELD MUSEUM OF NATURAL HISTORY

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
|---|---|---|---|---|---|---|
| **APRIL**<br>S M T W T F S<br>1 2 3<br>4 5 6 7 8 9 10<br>11 12 13 14 15 16 17<br>18 19 20 21 22 23 24<br>25 26 27 28 29 30 | **JUNE**<br>S M T W T F S<br>1 2 3 4 5<br>6 7 8 9 10 11 12<br>13 14 15 16 17 18 19<br>20 21 22 23 24 25 26<br>27 28 29 30 | | | | | 1<br>***Discovery Programs*** *each Saturday, Sunday* |
| 2<br>Field Museum opens in Grant Park, 1921 | 3 | 4<br>*Eta Aquarid meteor shower (18/hr)* | 5 | 6 | 7 | 8<br>***Kroc Environmental Field Trips*** *begin*<br>*full moon* |
| 9<br>Mother's Day | 10 | 11 | 12 | 13 | 14<br>*"Kwakiutl Winter Ceremonies, Arctic & N.W Coast lecture by P McNair 8 p.m.* | 15 |
| 16<br>*Daylight Savings Time begins*<br>*last quarter* | 17<br>*International Museum Day* | 18 | 19 | 20 | 21<br>*"Tlingit Property Law," Arctic & N W Coast lecture by R F Worl 8 p.m.* | 22<br>*Tlingit artist demonstrations 11 a m , 2 p.m*<br>*Gie Sun Dancers Tlingit dance performance 1 p m , 3 p.m*<br>*Demonstrations & dances to be repeated on Sunday, May 23* |
| 23<br>*(See [illegible] terda[illegible] events*<br>*new moon*<br>30 | 24<br>31<br>MEMORIAL DAY | 25 | 26<br>*Register now for* ***Summer Fun Workshops*** | 27 | 28<br>*'Heraldic Symbolism, Arctic & N W Coast lecture by J Vastokis 8 p m* | 29<br>*first quarter* |

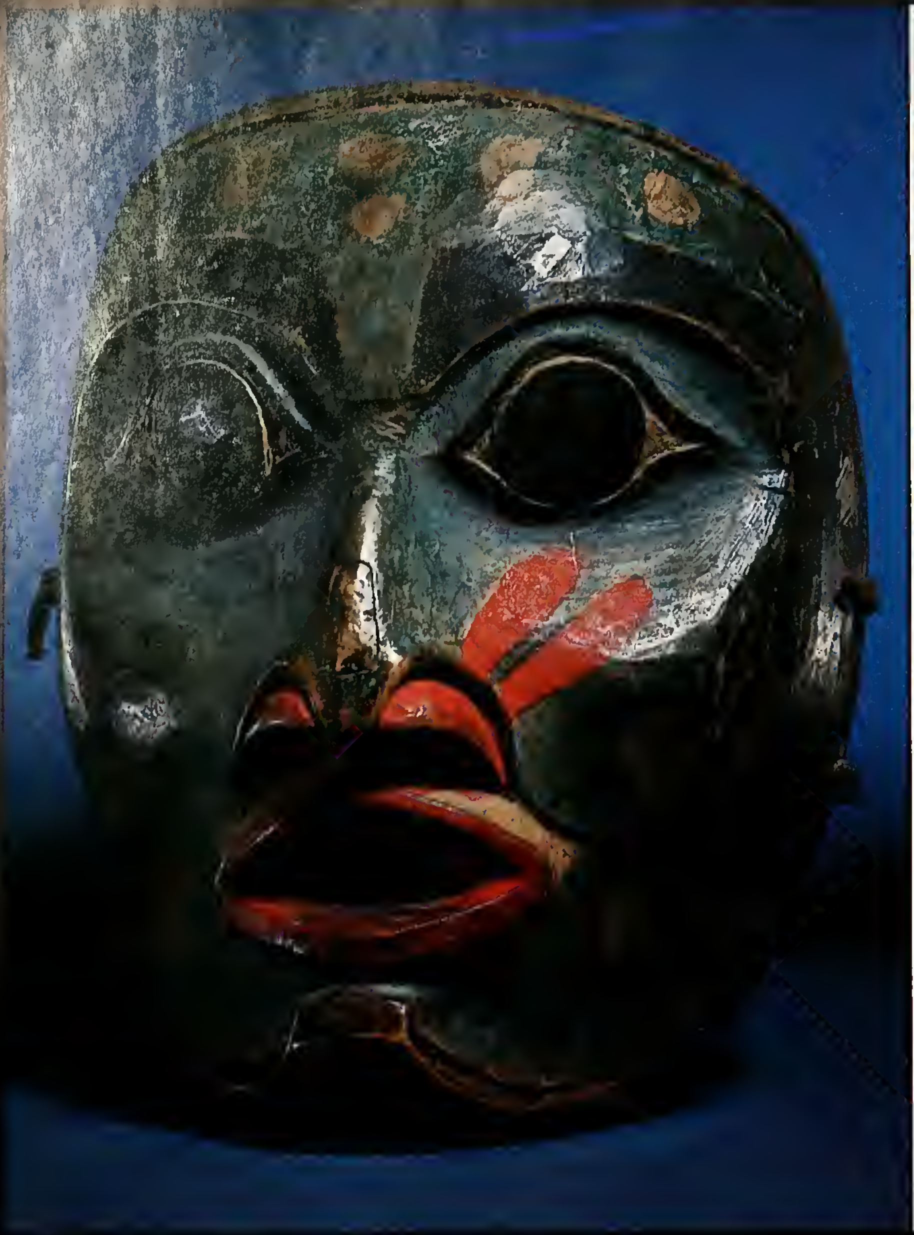


*Finger mask, used in dance performances; Eskimo (Port Clarence). Cat. 13429.*

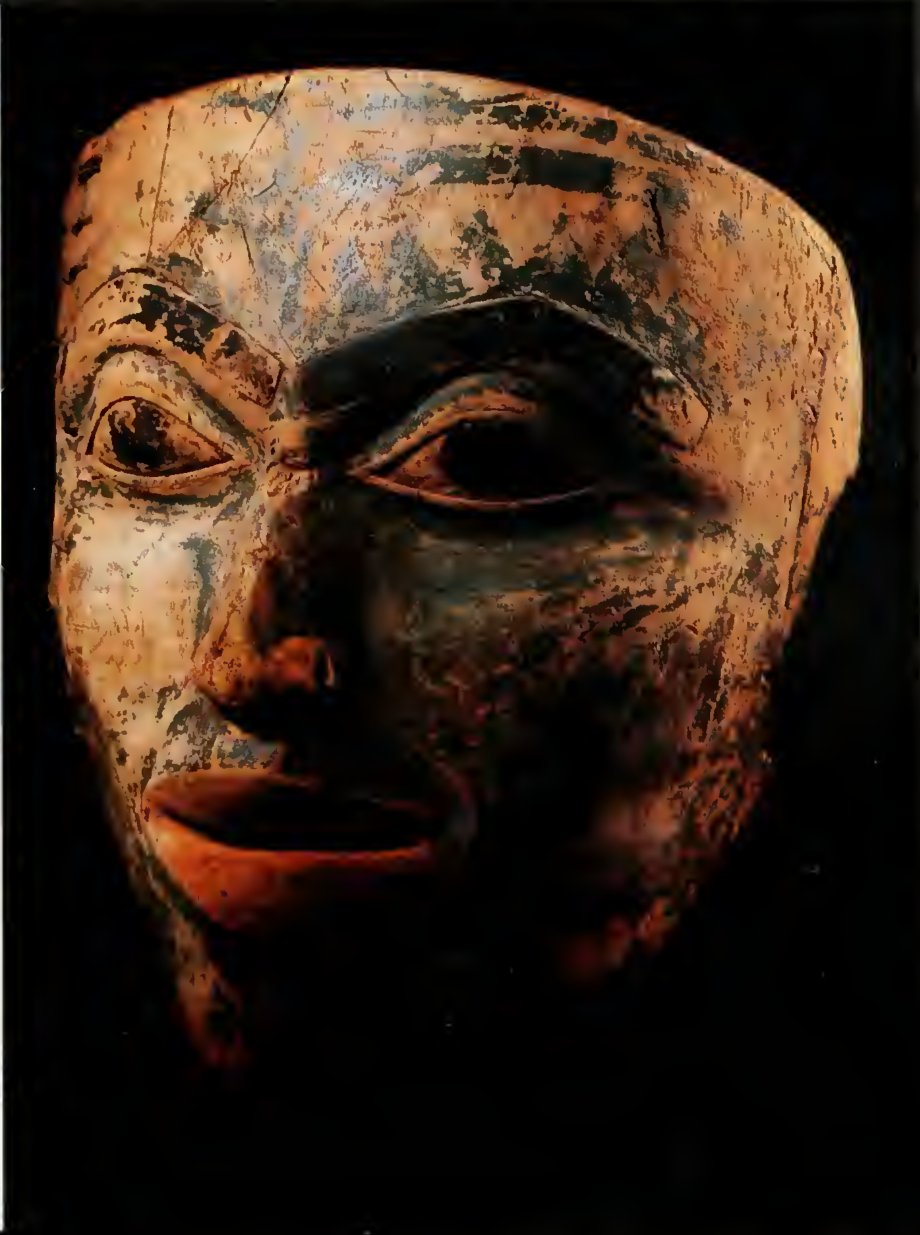
# JUNE

# FIELD MUSEUM OF NATURAL HISTORY

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
|---|---|---|---|---|---|---|
| MAY<br>S M T W T F S<br>1<br>2 3 4 5 6 7 8<br>9 10 11 12 13 14 15<br>16 17 18 19 20 21 22<br>23 24 25 26 27 28 29<br>30 31 | JULY<br>S M T W T F S<br>1 2 3<br>4 5 6 7 8 9 10<br>11 12 13 14 15 16 17<br>18 19 20 21 22 23 24<br>25 26 27 28 29 30 31 | 1 | Field Museum opens in Jackson Park, 1894<br>2 | 3 | 4<br>*"Historical Perspectives: Form and Tradition in Regional Art," Arctic & N.W Coast lecture by Bill Holm, 8 p.m.* | 5 |
| 6<br>○<br>*full moon* | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | Flag Day<br>14<br>◑<br>***Summer Adult Education Courses** begin*<br>*last quarter* | 15 | 16 | 17 | *longest days (15 hrs, 17 min) June 18-25*<br>18 | 19<br>*"Tales from the Smokehouse," Theatre Sans Fils puppet show 2 p.m.* |
| Father's Day<br>20<br>*"Tales from the Smokehouse," Theatre Sans Fils puppet show 2 p.m* | *first day of summer*<br>21<br>●<br>*new moon* | 22 | 23 | 24 | 25 | 26 |
| 27 | 28<br>◐<br>*first quarter* | 29 | 30 | | | |



*Shaman's spirit mask used in curing; Tlingit (Stickheen). Cat. 79257.*

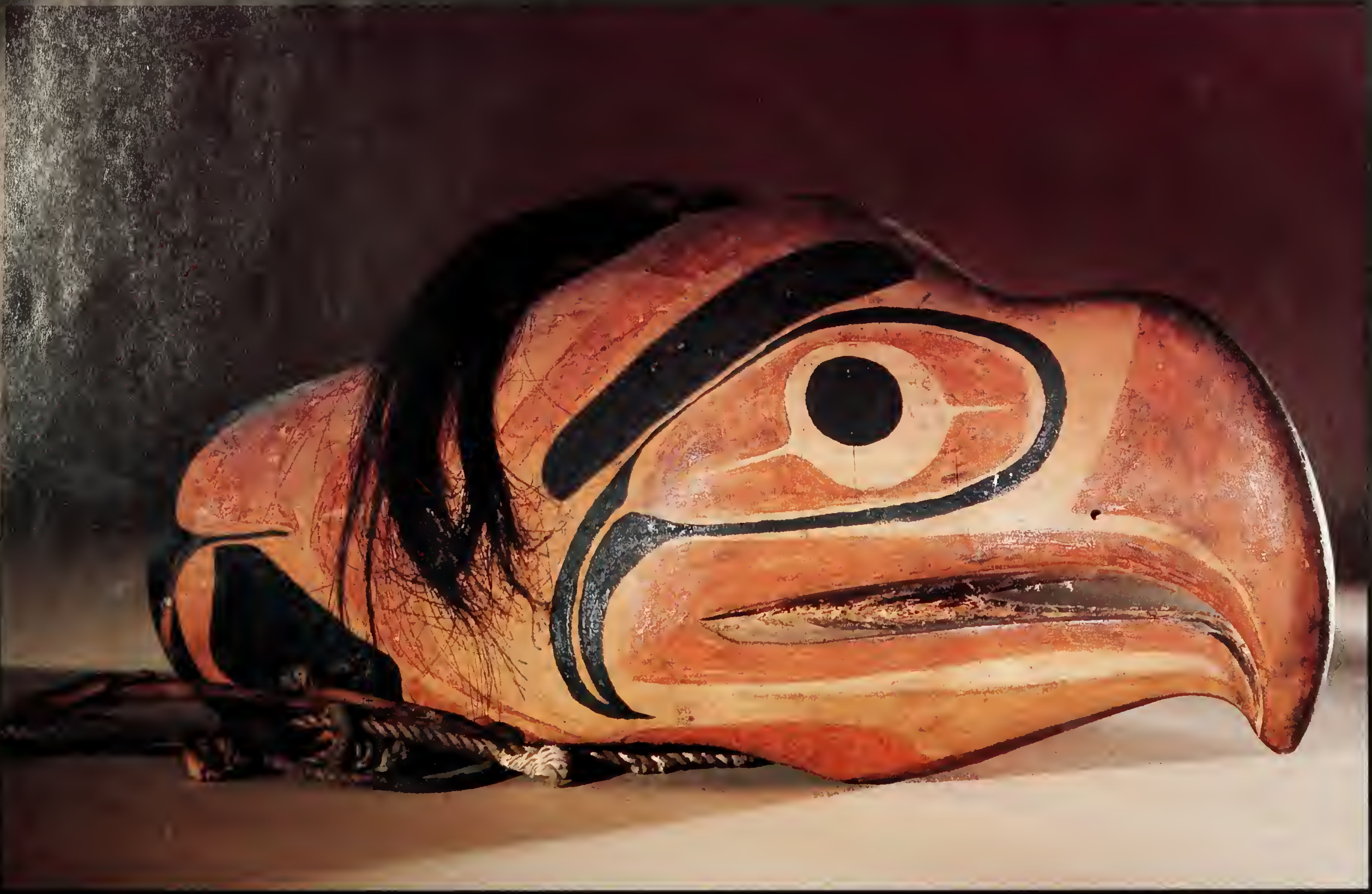


*Shaman's mask representing spirit of young woman; Tlingit (Dry Bay). Cat. 78285.*

# JULY

# FIELD MUSEUM OF NATURAL HISTORY

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
|---|---|---|---|---|---|---|
| JUNE<br>S M T W T F S<br>1 2 3 4 5<br>6 7 8 9 10 11 12<br>13 14 15 16 17 18 19<br>20 21 22 23 24 25 26<br>27 28 29 30 | AUGUST<br>S M T W T F S<br>1 2 3 4 5 6 7<br>8 9 10 11 12 13 14<br>15 16 17 18 19 20 21<br>22 23 24 25 26 27 28<br>29 30 31 | | | 1 | 2 | 3<br>**Discovery Programs** *each Saturday, Sunday* |
| 4<br>**INDEPENDENCE DAY**<br>*Earth furthest from Sun (aphelion) 94.5 million miles* | 5 | 6<br>*total lunar eclipse (U.S. & Canada)*<br>○ *full moon*<br>*Highlight Tour 1:00 p.m.* | 7<br>*Highlight Tour 1:00 p.m.* | 8<br>*Highlight Tour 1:00 p.m.* | 9 | 10 |
| 11 | 12<br>*Highlight Tour 1:00 p.m* | 13<br>*Highlight Tour 1:00 p.m* | 14<br>◐ *last quarter*<br>*Highlight Tour 1:00 p.m.* | 15<br>*Highlight Tour 1:00 p.m.* | 16 | 17 |
| 18 | 19<br>*Highlight Tour 1:00 p m* | 20<br>*partial solar eclipse (N W No. Am.)*<br>● *new moon*<br>*Highlight Tour 1:00 p.m* | 21<br>*Highlight Tour 1:00 p.m.* | 22<br>*Highlight Tour 1:00 p.m.* | 23 | 24 |
| 25 | 26<br>*Highlight Tour 1:00 p m* | 27<br>◑ *first quarter*<br>*Highlight Tour 1:00 p m* | 28<br>*Highlight Tour 1:00 p m* | 29<br>*Highlight Tour 1:00 p m* | 30<br>*Delta Aquarid meteor shower (38/hr)* | 31 |



*Eagle mask with human hair; Nootkan Makah. Cat. 61904.*

# AUGUST

# FIELD MUSEUM OF NATURAL HISTORY

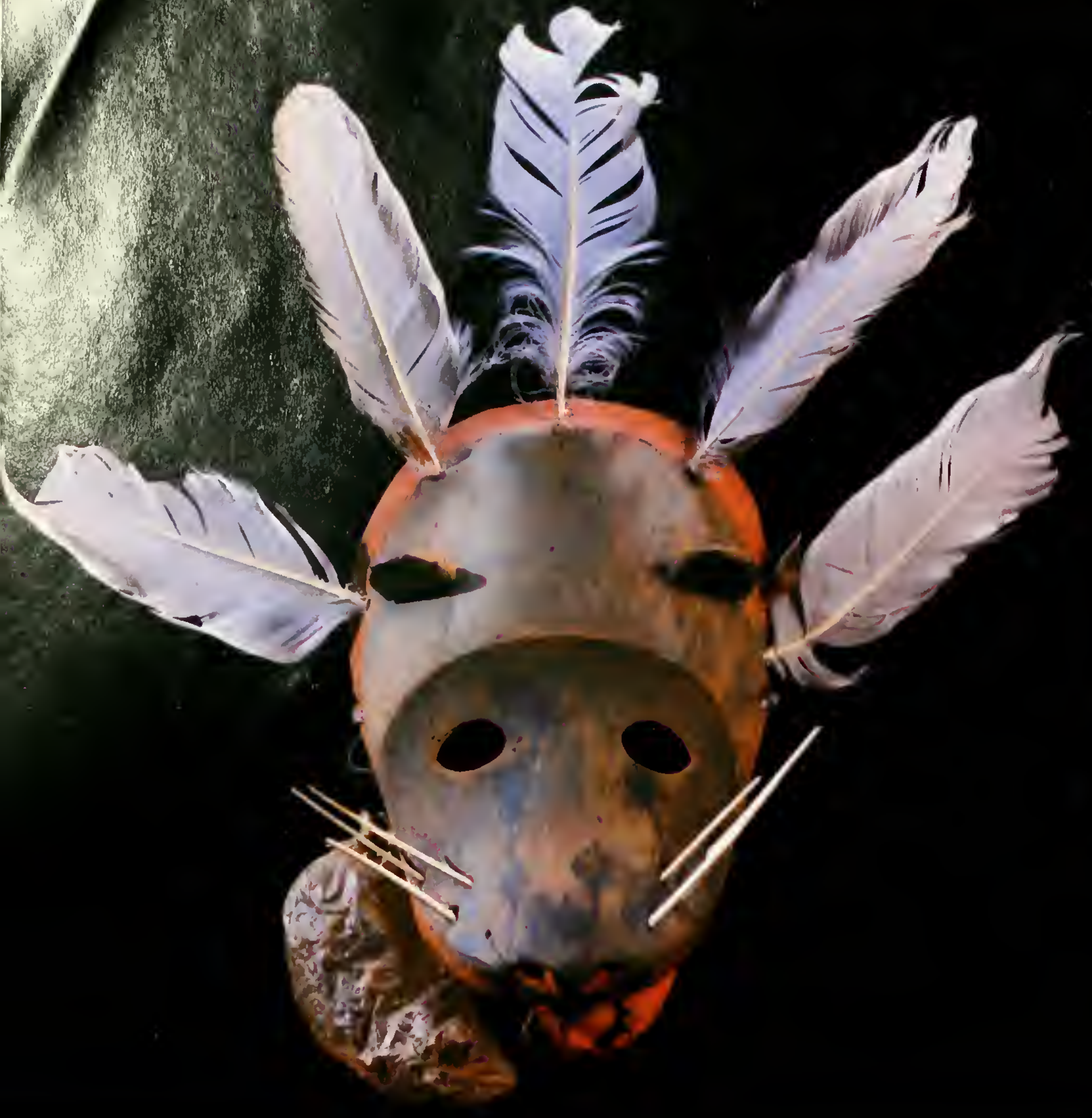
| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
|---|---|---|---|---|---|---|
| 1<br>***Discovery Programs*** *each Saturday, Sunday* | 2<br>*Highlight Tour 1:00 p.m.* | 3<br>*Highlight Tour 1:00 p.m* | 4<br>○ *full moon*<br>*Highlight Tour 1:00 p.m* | 5<br>*Highlight Tour 1.00 p.m.* | 6 | 7 |
| 8 | 9<br>*Highlight Tour 1:00 p.m* | 10<br>*Highlight Tour 1:00 p.m.* | 11<br>*Perseid meteor shower (65/hr) Aug 11-13*<br>*Highlight Tour 1:00 p.m.* | 12<br>◑ *last quarter*<br>*Highlight Tour 1:00 p.m.* | 13<br>*Teachers: reserve free loan materials available from Harris Extension to use with your classes this year* | 14 |
| 15 | 16<br>*Highlight Tour 1:00 p.m* | 17<br>*Highlight Tour 1.00 p.m.* | 18<br>*Highlight Tour 1:00 p.m.* | 19<br>● *new moon*<br>*Highlight Tour 1:00 p.m.* | 20 | 21 |
| 22 | 23<br>*Highlight Tour 1:00 p.m.* | 24<br>*Highlight Tour 1:00 p.m.* | 25<br>*Highlight Tour 1:00 p.m* | 26<br>◐ *first quarter*<br>*Highlight Tour 1:00 p.m.* | 27 | 28 |
| 29 | 30<br>*Highlight Tour 1:00 p m* | 31<br>*Highlight Tour 1 00 p m* | | | | |

### JULY

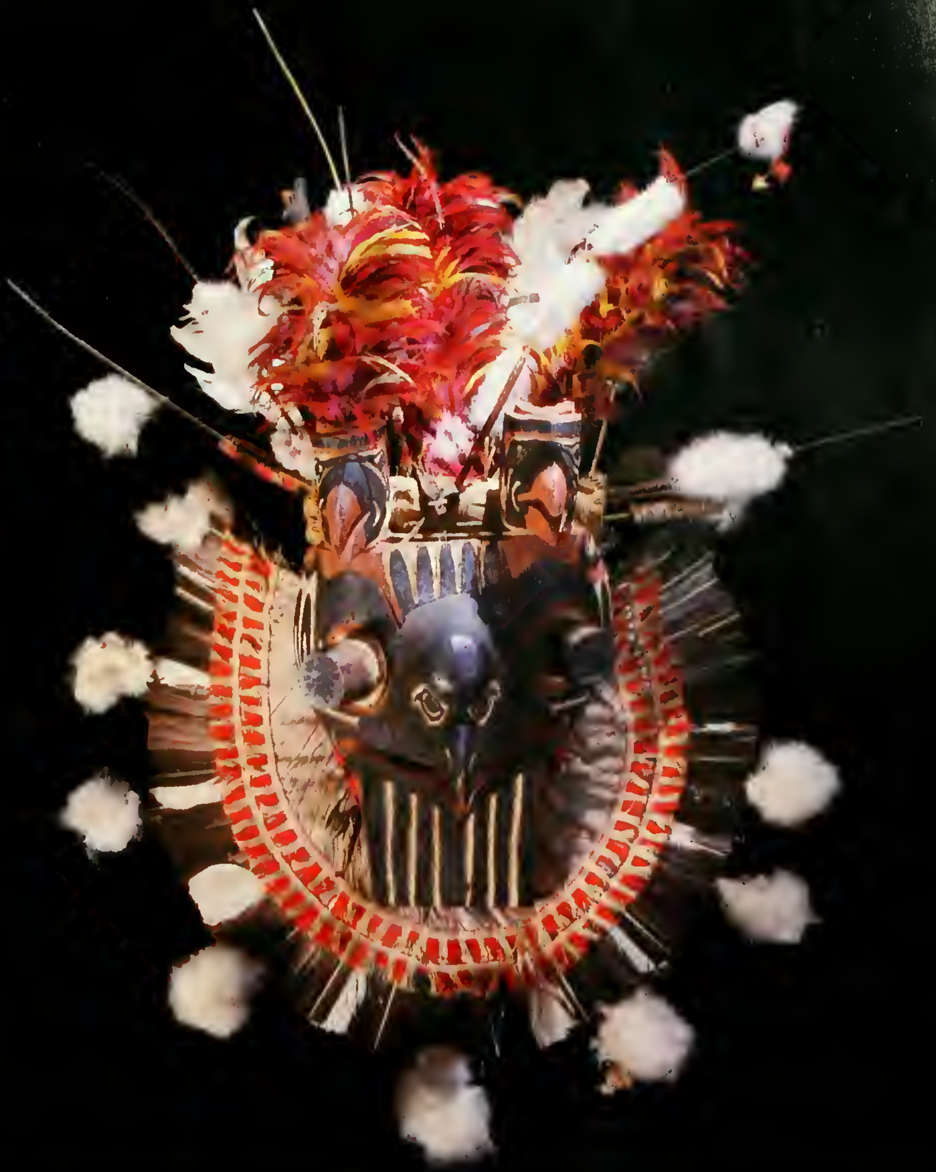
| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | | | | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 |

### SEPTEMBER

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | | |



ox or wolf mask with quill trim and bladder tongue; Eskimo (probably from t. Michael). Cat. 13430.

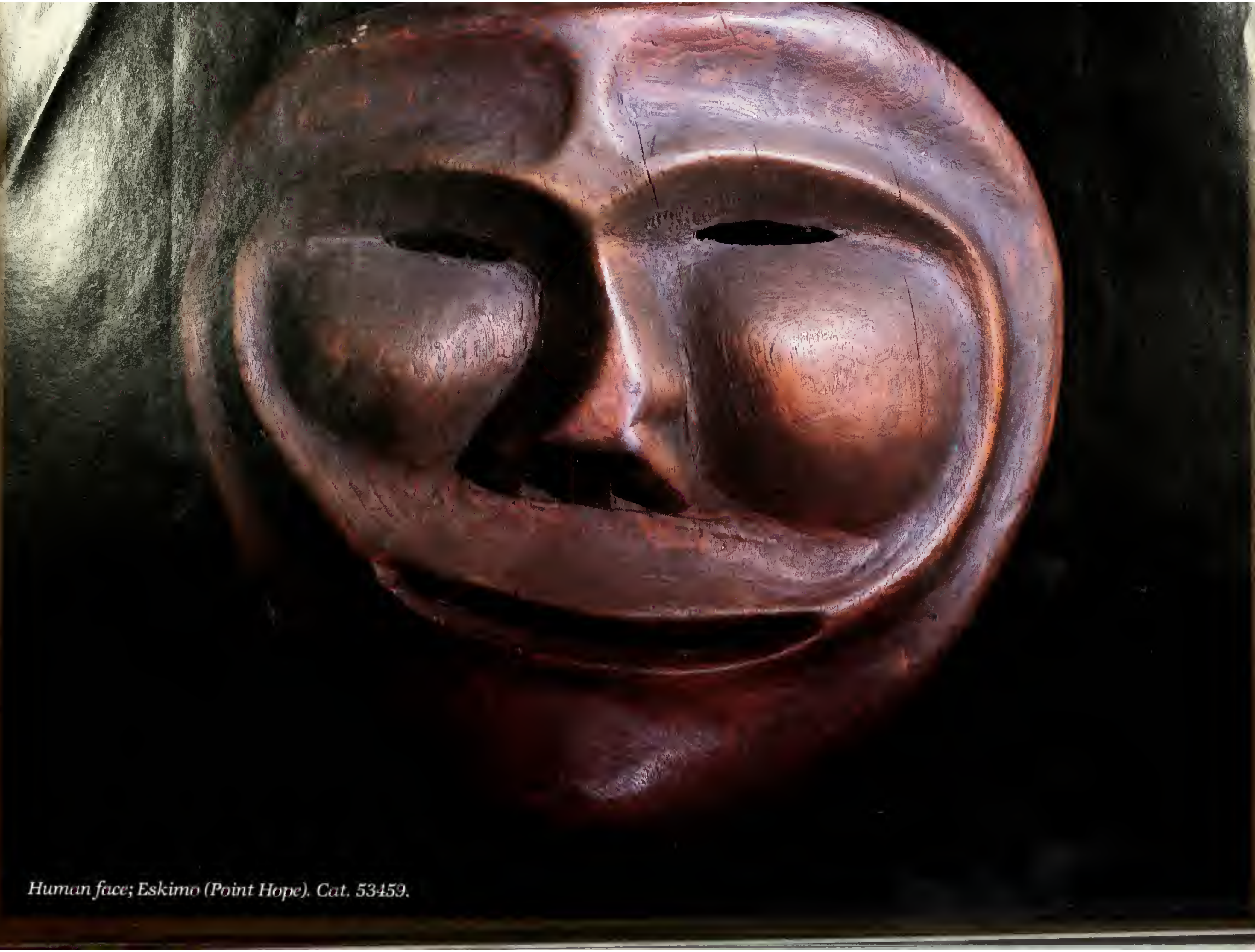


Skwaikhwey spirit mask with raven head for nose; Coast Salish (Nanaim Cat. 85480.

# SEPTEMBER

# FIELD MUSEUM OF NATURAL HISTORY

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
|---|---|---|---|---|---|---|
| **AUGUST**<br>S M T W T F S<br>1 2 3 4 5 6 7<br>8 9 10 11 12 13 14<br>15 16 17 18 19 20 21<br>22 23 24 25 26 27 28<br>29 30 31 | **OCTOBER**<br>S M T W T F S<br>1 2<br>3 4 5 6 7 8 9<br>10 11 12 13 14 15 16<br>17 18 19 20 21 22 23<br>24 25 26 27 28 29 30<br>31 |  | 1<br>*Highlight Tour 1:00 p.m.* | 2<br>*Highlight Tour 1:00 p.m.* | 3<br>○<br>*full moon* | 4 |
| 5<br>**Discovery Programs** *each Saturday, Sunday* | **LABOR DAY** 6 | 7<br>*Teachers: begin planning a field trip for your class to Field Museum* | 8 | 9 | 10<br>◐<br>*last quarter* | 11 |
| 12 | 13<br>*Register now for* ***Fall Adult Education Courses*** | 14 | 15 | 16 | 17<br>●<br>*new moon* | **ROSH HASHANAH** 18 |
| 19 | 20 | 21 | 22 | *first day of fall* 23 | 24 | 25<br>◑<br>*first quarter* |
| American Indian Day 26 | **YOM KIPPUR** 27 | 28 | 29 | 30 |  |  |

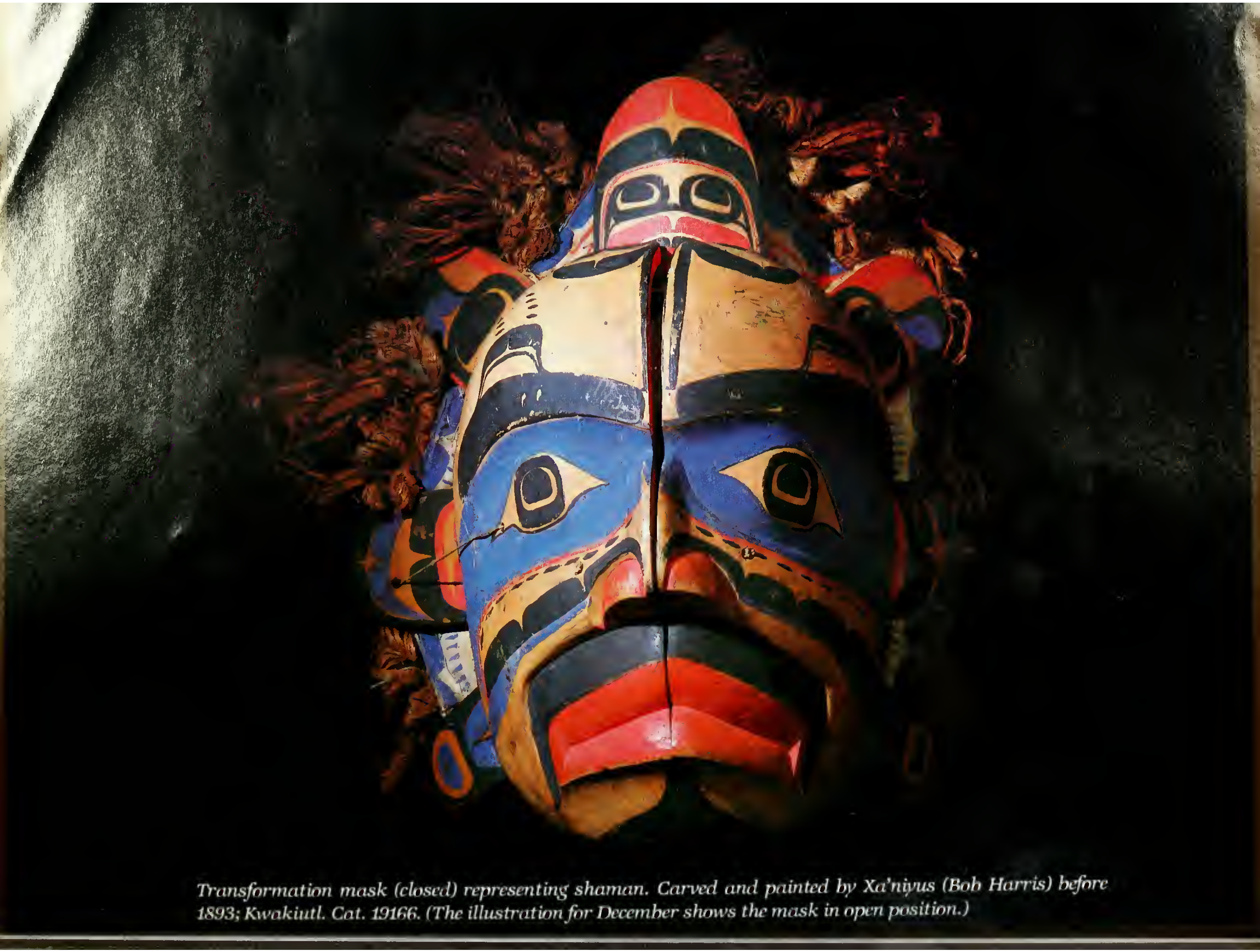


*Human face; Eskimo (Point Hope). Cat. 53459.*

# OCTOBER

# FIELD MUSEUM OF NATURAL HISTORY

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
|---|---|---|---|---|---|---|
| **SEPTEMBER**<br>S M T W T F S<br>1 2 3 4<br>5 6 7 8 9 10 11<br>12 13 14 15 16 17 18<br>19 20 21 22 23 24 25<br>26 27 28 29 30 | **NOVEMBER**<br>S M T W T F S<br>1 2 3 4 5 6<br>7 8 9 10 11 12 13<br>14 15 16 17 18 19 20<br>21 22 23 24 25 26 27<br>28 29 30 | | | | 1 | 2<br>**Ayer Film**<br>**Lecture:** *"Austria"*<br>*1:30 p.m.* |
| 3<br>○<br>*full moon* | 4 | 5 | 6 | 7 | 8 | *Draconid meteor shower (10/hr)* 9<br>◐<br>**Ayer Film**<br>**Lecture:** *"Hawaii"*<br>*1:30 p.m.*<br>*last quarter* |
| 10 | Columbus Day 11 | 12 | 13 | 14 | 15 | 16<br>**Ayer Film**<br>**Lecture:** *"Scotland"*<br>*1:30 p m* |
| 17<br>●<br>*new moon* | 18<br>***Fall Adult Education Courses*** *begin* | 19 | *Orionid meteor shower (10/hr)* 20 | 21 | 22<br>*Paul Winter Consort, 8 p.m* | *swallows leave San Juan Capistrano* 23<br>**Ayer Film**<br>**Lecture:** *"Japan"*<br>*1 30 p m* |
| U.N. Day 24<br>31<br>*een* | 25<br>◑<br>*first quarter* | 26 | 27 | 28 | 29 | 30<br>**Ayer Film**<br>**Lecture:** *"Great Train Trip across Siberia*<br>*1 30 p m* |

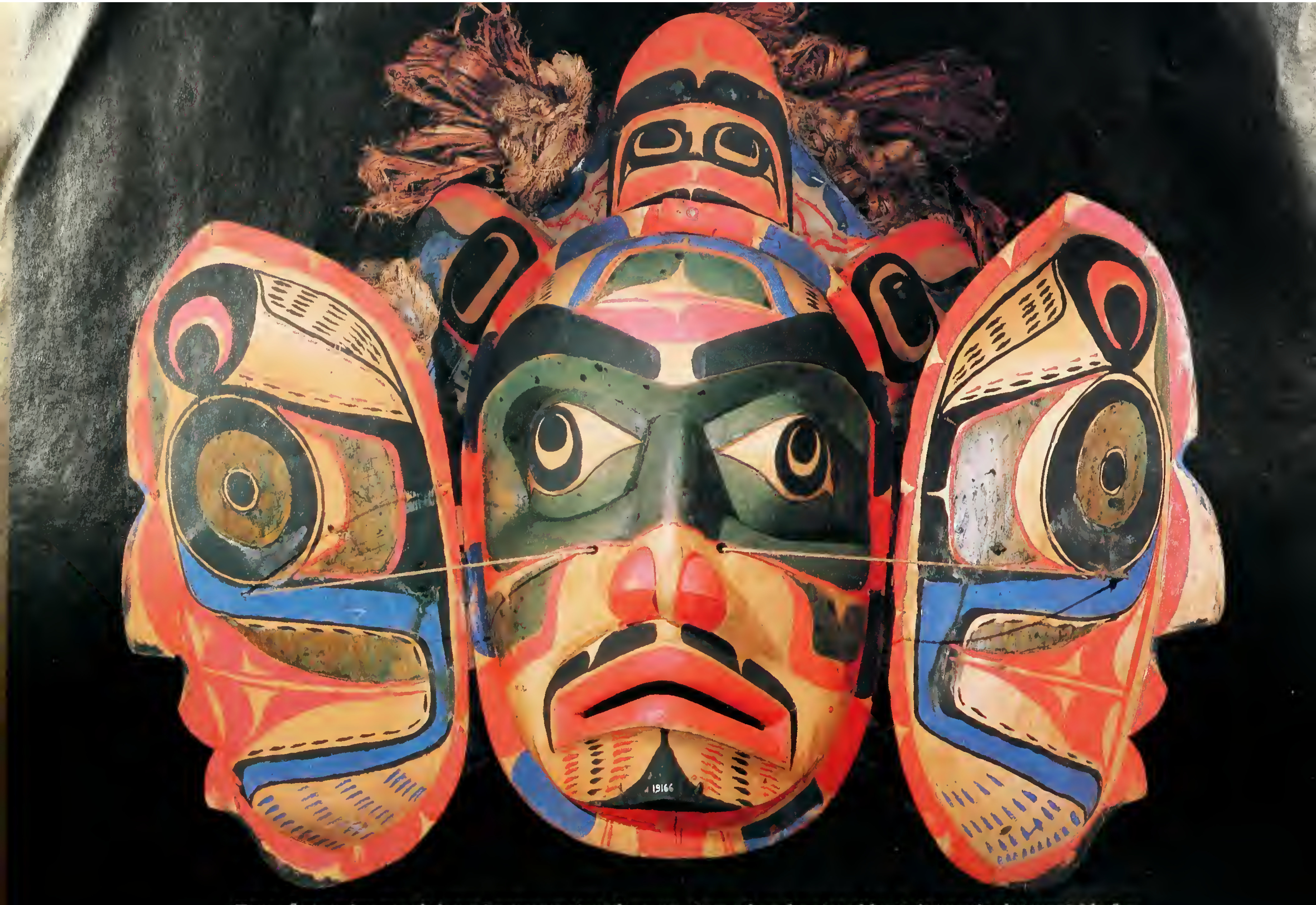


*Transformation mask (closed) representing shaman. Carved and painted by Xa'niyus (Bob Harris) before 1893; Kwakiutl. Cat. 19166. (The illustration for December shows the mask in open position.)*

# NOVEMBER

# FIELD MUSEUM OF NATURAL HISTORY

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
|---|---|---|---|---|---|---|
| | 1<br>○<br>*full moon* | General Election Day<br>2 | 3 | 4 | 5 | 6<br>***Ayer Film Lecture*** *"Greece"*<br>*1:30 p.m.* |
| 7<br>**Discovery Programs** each Saturday, Sunday | 8<br>◑<br>*last quarter* | *Taurid meteor shower (16/hr)*<br>9 | 10 | Veteran's Day<br>11 | 12 | 13<br>***Ayer Film Lecture*** *"Mexico"*<br>*1:30 p.m.* |
| 14 | 15<br>●<br>*new moon* | *Leonid meteor shower (15/hr)*<br>16 | 17 | 18 | 19 | 20<br>***Ayer Film Lecture*** *"Antarctica"*<br>*1:30 p.m.* |
| 21 | 22 | 23<br>◐<br>*first quarter* | 24 | 25<br>**THANKSGIVING**<br>*Andromedid meteor shower (10/hr) Nov 25-27* | 26 | 27<br>***Ayer Film Lecture*** *"Italy"*<br>*1:30 p.m.* |
| 28 | 29 | 30 | | | OCTOBER<br>S M T W T F S<br>1 2<br>3 4 5 6 7 8 9<br>10 11 12 13 14 15 16<br>17 18 19 20 21 22 23<br>24 25 26 27 28 29 30<br>31 | DECEMBER<br>S M T W T F S<br>1 2 3 4<br>5 6 7 8 9 10 11<br>12 13 14 15 16 17 18<br>19 20 21 22 23 24 25<br>26 27 28 29 30 31 |



*Transformation mask (open) representing shaman. Carved and painted by Xa'niyus (Bob Harris) before 1893; Kwakiutl. Cat. 19166. (The illustration for November shows the same mask in closed position.)*

# DECEMBER

# FIELD MUSEUM OF NATURAL HISTORY

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
|---|---|---|---|---|---|---|
| **NOVEMBER**<br>S M T W T F S<br>1 2 3 4 5 6<br>7 8 9 10 11 12 13<br>14 15 16 17 18 19 20<br>21 22 23 24 25 26 27<br>28 29 30 | **JANUARY 1983**<br>S M T W T F S<br>1<br>2 3 4 5 6 7 8<br>9 10 11 12 13 14 15<br>16 17 18 19 20 21 22<br>23 24 25 26 27 28 29<br>30 31 |  | 1<br>○<br>*full moon* | 2 | 3 | 4<br>***Discovery Programs** each Saturday, Sunday* |
| 5 | 6 | 7<br>◑<br>*last quarter* | 8 | 9 | 10 | **HANNUKAH** 11 |
| 12 | *Geminid meteor shower (55/hr)* 13 | 14 | 15<br>●<br>*new moon* | 16 | *shortest days of year (9 hrs, 5 min) Dec. 17-25* 17 | 18 |
| 19 | 20 | *first day of winter* 21 | 22 | 23<br>◐<br>*first quarter* | 24 | **CHRISTMAS** Museum closed 25 |
| 26 | 27 | 28 | 29 | *total lunar eclispse (U.S. & Canada)* 30<br>*Highlight Tour 1.00 p m.*<br>○<br>*full moon* | 31 |  |

LIBRARY
ILLINOIS NATURAL HIST SURVEY
607 E PEABODY
CHAMPAIGN IL 61820

# December & January at Field Museum

*(December 15 through January 15)*

### Continuing Exhibits

"Opening the Egyptian Tombs: A Living Experience." A newly organized exhibit in the Egyptian Collection, Hall J, presents prehistoric and early historic Egyptian exhibits in their proper context. Visitors may walk through the tomb chapel rooms of Egyptian nobleman *Unis-ankh*, who died 4,000 years ago. Afterlife offerings in the tomb chapel of another Egyptian nobleman, *Netjer-user*, may also be viewed through a glass wall. Outside the entrance to the Egyptian Room, a replica of the *Tomb Chapel of Nakht*, on loan from the Metropolitan Museum of Art, displays facsimiles of some of the finest and most colorful Egyptian tomb paintings ever discovered. Hall J, Ground floor.

"Portraits of Man." This excellent collection of lifelike bronze statues depicting mankind around the world is the work of Malvina Hoffman (1885-1966), who did some of her earlier work under Auguste Rodin. 2nd floor balcony and ground floor.

American Indian Halls trace the anthropological history and cultural development of the original Americans, from the time of their arrival on the North American continent (before 20,000 B.C.) to the present. Hall 5 contains a traditionally made Pawnee earth lodge—the home and ceremonial center of Pawnee Indians as it existed in the mid-1800s. Halls 4 through 10, main floor east.

Hall of Asiatic Mammals. Marco Polo's sheep, with their gracefully sweeping horns, are among the first animals you encounter in this hall of fascinating habitat groups. Swamp deer stand in muddy ground, a snow leopard directs a piercing stare at visitors, and the Indian rhinoceros and the oxen of Southeast Asia startle one with their great size. Hall 17, first floor.

### New Programs

Winter Fun. Children of all ages are invited to join in Field Museum's natural history workshops. Groups will meet on one or two Saturdays in January. Members will receive in the mail a brochure with more information and prices; nonmembers may call 322-8854 to request the brochure.

☐ January 9, 10 a.m.-12 noon
"Dinosaur Life." Craft project and tour for ages 4-5.
"Costumes for the Sorcerers' Dance." Craft project and tour of Tibetan exhibit for ages 6-8. Continued on January 16.
"Journey Through Time." Craft project and film about geology for ages 6-8.

☐ January 9, 1 p.m.-3 p.m.
"Different Faces from Far-away Places." Craft project and tour for ag[illegible] Continued on January 16.
"Egyp[illegible]lyphs." Craft project and tour for ages 9-12.
[illegible] Craft project and tour for ages 4-5.

☐ January 16, 10 a.m.-12 noon
"Arctic Journey." Craft project (will make mini-igloo, weather permitting) and tour for ages 4-5.
"Costumes for the Sorcerers' Dance." Continuation of the January 9 workshop.
"Metal Casting." Craft project and tour for ages 9-12.

☐ January 16, 1 p.m.-3 p.m.
"Different Faces from Far-away Places." Continuation of the January 9 workshop.
"Indian Drums." Craft project and tour of Pawnee Earth Lodge for ages 6-8.
"Metal Casting." Craft project and tour for ages 9-12.

Family Film Series. Films depicting family life in different parts of the world are presented on the first three Saturdays in December. Weekend Discovery Programs are planned in conjunction with these films. Free with Museum admission. Lecture Hall I at 11:30 a.m. and 1:30 p.m.

December 19: "Serama's Mask." A Balinese boy wants to participate in his father's final dance; but first he must carve his own mask.

Weekend Discovery Program: "Indonesian Mask-Making" craft project, 2 p.m.

Weekend Discovery Programs. On Saturdays and Sundays from 11 a.m. to 3 p.m. you can participate in a variety of free tours, projects, and films on natural history topics. In December you can explore the Egyptian pyramids, learn about fireballs and shooting stars, and view films on the beginnings of China. Check the *Weekend Sheet* at Museum entrances for programs and locations or call 322-8854 for specific program information. In January, Film Features focuses on the history of China.

Winter Journey. "The Adventures of Marco Polo." In this self-guided tour, visitors can observe some of the animals that Marco Polo saw on his travels and read his own descriptions of them. Free *Journey* pamphlets available at Museum entrances.

### Continuing Programs

Volunteer Opportunities. Individuals with scientific interests and backgrounds are needed to work in various Museum departments. Contact the Volunteer Coordinator: 922-9410, ext. 360.

December and January Hours. The Museum is open 9 a.m.-4 p.m. Monday-Thursday; 9 a.m.-5 p.m., Saturday and Sunday; and 9 a.m.-9 p.m., Friday. Closed Christmas and New Year's.

The Museum Library is open weekdays 9 a.m. to 4 p.m. Obtain a pass at the reception desk, main floor. Closed December 24 and 25, 1981, and January 1, 1982.

Museum Phone: (312) 922-9410

BOUND BY
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